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ENGRAVINGS

OF

THE LIGAMENTS,

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THE ORIGINAL WORKS

OF

The Caldanis.

WITH DESCRIPTIVE LETTER-PRESS.

BY

EDWARD MITCHELL, ENGRAVER.

REVISED AND CAREFULLY COMPARED WITH NATURE,

BY

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EDINBURGH:

PRINTED FOR MACLACHLAN AND STEWART; SAMUEL HIGHLEY, LONDON;
AND R. AND J. FINLAY, GLASGOW.

1834.

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PL. I.

Fig. 1.

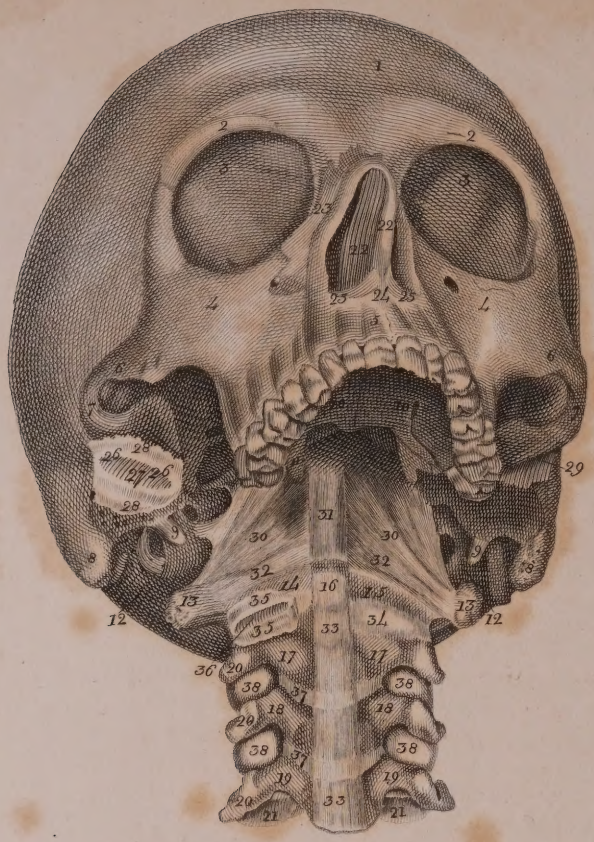
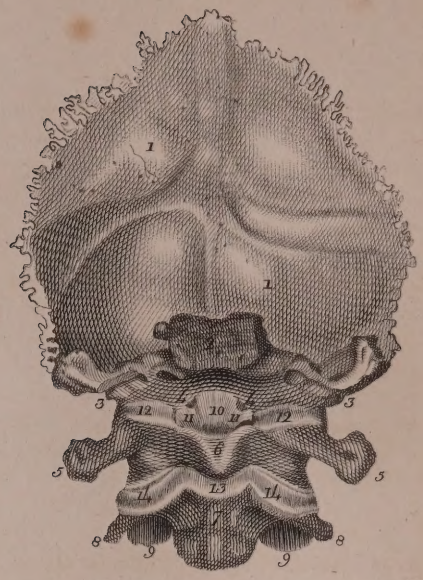


Fig. 2.



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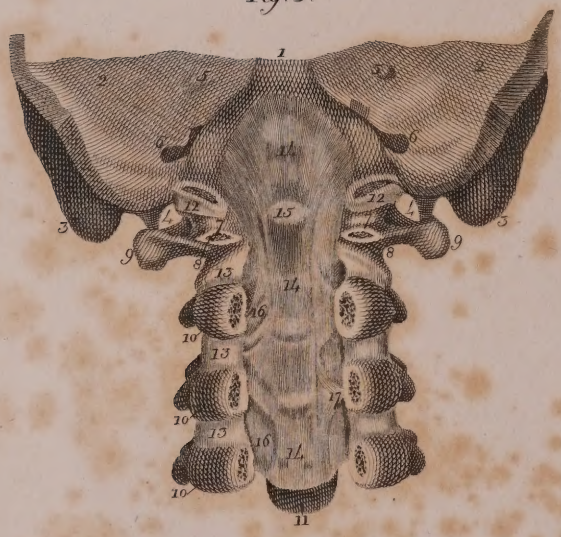

Fig. 4.

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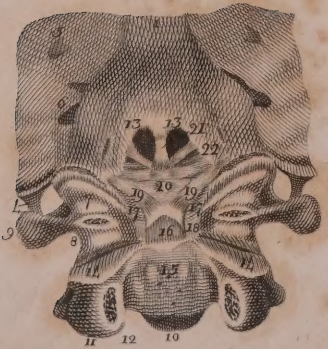

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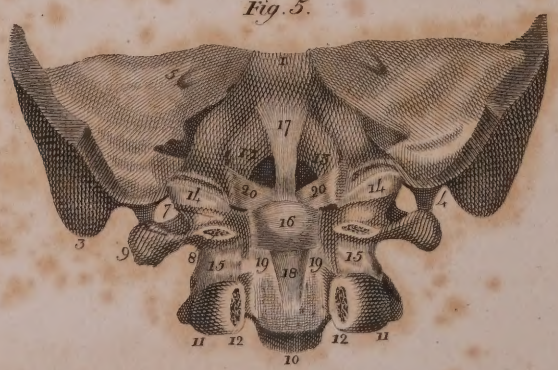

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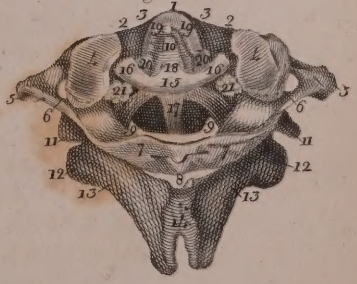

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PLATE I.

Shows the Ligaments which connect the head with the First and Second Cervical Vertebræ.

Figure I.

Represents the anterior surface of the cranium, with some of the superior vertebræ of the neck.

1. Frontal bone.
2, 2. Supra orbital margins.
3, 3. Orbital arches.
4, 4. Superior maxillary bones. 5. A spine proceeding from the inferior nasal process of that bone.
6, 6. Malar, or cheek bones.
7. Zygomatic process of the temporal bones. 8, 8. Mastoid or mammillary process, and 9, 9. the styloid process.
10, 10. Palate bones.
11, 11. Hook of the internal pterygoid process.
12, 12. Occipital bone.
13, 13. Transverse processes of the atlas. 14, 15, its anterior arch. 16. A tubercle on the middle and anterior part of the atlas.
17, 17, 18, 18, 19, 19. Bodies of the 2d, 3d, and 4th Cervical vertebrae.
20. Transverse processes of the same vertebræ.
21. Inferior oblique processes of the 4th vertebra incrusted with smooth cartilage.
22. Cartilaginous septum of the nose.
23. Part of the superior triangular cartilage.
24, 25, 25. Ligamentous fibres which bind the cartilaginous septum inferiorly and anteriorly to the nasal process of the superior maxillary bone; some, 24, go straight from the spine to the septum, and lie mesially between the oblique fasciculi, 25, 25, which are connected with the sides of that cartilage.
26, 26, 27. Cartilage which is placed between the temporal bone, and the condyle of the lower jaw. 26, 26, its thickened edge which adheres to the capsular membrane, 28, of this articulation. 27. Inferior surface of the cartilage in which it is lost,
28, 28. Articular membrane which, descending from the glenoid cavity of the right temporal bone, and from the tubercle of the zygomatic process, is attached to a portion of the cartilaginous covering, and is finally lost in the condyle of the jaw. *It is the inferior membrane of Vietbrecht.*
29. Glenoid cavity of the temporal bone of the left side incrusted with smooth cartilage, with which the condyle of the lower jaw is articulated.
30, 30. Membranous ligament of the anterior ring of the atlas, which *Mauchart* called the membrane covering the anterior occipital ligament of the atlas. It occupies and shuts up the space between the basilar process of the occipital bone, where it arises near the foramen magnum, and the anterior arch of the atlas on the margin of which it is lost. The oblique fibres run outwards from the internal to the external parts.
31. Middle straight slip of perpendicular fibres, which proceeds from the occipital bone to the anterior tubercle of the atlas, and adheres very strongly to it.
32, 32. Ligamentous fibres running transversely from the right and left transverse processes of the atlas, and distributed on its anterior arch near the tubercle.
33, 33. Anterior longitudinal fascia of the vertebræ passing downwards from the anterior tubercle of the atlas.
34. Ligament of the articulation of the oblique processes on the left side which connect the 1st and 2d vertebræ together.
35, 36. The same ligament dissected on the right side, so that the cleft between the oblique processes themselves can be seen, and 36, the inferior surface of the inferior oblique process of the 1st vertebra incrusted with smooth cartilage.
37, 37. Cartilaginous ligaments or intervertebral cartilages between the 2d and 3d, and 3d and 4th cervical vertebræ.
38, 38. Ligaments between the oblique or articular processes of these vertebræ.

Figure II.

The occipital bone with the two superior cervical vertebræ viewed anteriorly.

1, 1. Anterior and concave surface of the occipital bone.—2. Basilar process, by which the occipital bone is connected anteriorly with the sphenoid bone.—3, 3. Occipital condyles.—4, 4. Anterior portion of the foramen magnum.

5, 5. Tranverse processes of the atlas.—6. Its Anterior tubercle.
7. Body of the second vertebra.—8, 8. Its transverse processes.—9, 9. The inferior oblique processes.
10. Ligament, which is seen when the membrane of the anterior ring is removed. It arises anteriorly from the extremity of the odontoid process, and is inserted into the *anterior* margin of the foramen magnum. Fig. vii. 21. gives a posterior view of this ligament.
11, 11. Two oblique ligaments running from the odontoid process itself into the *lateral* margin of the same foramen. See Fig. vii. 22, 22.
12, 12. Articular ligaments, which connect the occipital condyles with the superior articular processes of the atlas.
13. Ligament, which joins the body of the 2d vertebra to the anterior arch of the atlas. *Mauchart* calls it the ligament, shutting up the space between the 2d vertebra, and the ring of the 1st anteriorly.
14, 14. The same as in Fig. i. 34, 35.

Figure. III.

Gives a posterior view of the base of the cranium and the four upper cervical vertebræ. The posterior part of the occipital bone, and the posterior arches of all the vertebræ have been sawn through and removed, so as to expose the anterior wall of the vertebral canal.

1. Basilar portion of the occipital bone.
2, 2. Pyramids of the temporal bones: by some termed the petrous portions.
3, 3. Posterior portion of the mastoid process.
4, 4. Portion of the styloid process.
5, 5. Foramina, or canals through which the fascial and auditory nerves pass.
6, 6. Notch, or opening for the jugular vein and nervus vagus.
7, 7. Lateral portions of the first vertebra.
8, 8. Where the posterior arch arises from the lateral portions of the 1st Vertebra dissected. —9, 9. The transverse processes of the same vertebra.
10, 10, 10. Portions of the posterior arches of the 2d, 3d and 4th vertebræ.
11. Inferior and posterior surface of the body of the 4th vertebra.
12, 12, 13, 13. Articular capsules, seen from the back.
14, 14. *Posterior longitudinal fascia* from which the dura mater has been separated. Namely, powerful and dense fibres arise from the occipital bone, above the inside of the anterior margin of the foramen magnum. They descend and pass over the posterior portion of the anterior arch of the atlas, and the body of the second vertebra, and are then attached to the bodies themselves of all the vertebræ. Below the 2d vertebra the fibres which form the fascia proceed from one vertebra to another, although they seem to compose one continuous ligament.
15. Where the ligamentous fascia is a little raised by the odontoid process of the 2d vertebra.
16, 16. Ligamentous fibres which run over the posterior surface of the bodies of the vertebræ, and adhere to them.
17, 17. Cellular bands, which bind the ligamentous fascia to the sides of the vertebræ.

Figure IV.

Shows the same part of the head and neck as in Fig. iii.

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11. as in Fig. iii.
12. Condyles of the occipital bone, incrusted with cartilage.
13, 13. Anterior condyloid foramina through which pass the lingual or ninth pair of nerves.
14, 14. The same as in Fig. iii. 13 and 14.
15, Superior portion of the ligamentous fascia cut through and laid back.
16, 16. Ligamentous fibres running from the occipital bone to the body of the 2d vertebra, they lie below the fascia longitudinalis postica. Some of the fibres come from the margins of the foramina 13, 13. Others from the internal margin of the condyles; they leave a hollow or sulcus in which is placed the transverse ligament and its appendages.
17, 17. Small but powerful ligamentous slip, which comes from the internal margin of the superior articular sinus of the 1st vertebra, mingling with the fasciculi 16, 16, that it may attach itself posteriorly to the body of the 2d vertebra.
18. Transverse ligament of the atlas. See Fig. v. and vi.—19, its superior appendix. See Fig. v. 17.—20, its inferior appendix, Fig. v. 18.

Figure V.

Exhibits the same portion of the head, with the atlas and vertebra dentata viewed posteriorly.

1, 2, 3, 4, 5, 6, 7, 8, 9. as in Fig. iii.
10. Inferior and posterior surface of the anterior and inferior portion of the 2d vertebra.—11. Portions of its posterior arch, which meet in the spinous process.—12, 12. Where the arch itself has been cut off, together with the spinous process.
13, 13. Anterior margin of the foramen magnum.
14, 14. Same as in Fig. iii. 12, 12.

15, 15. Same as in Fig. iii. 13, 13.

16, 16. Transverse ligament of the atlas. It arises from a certain small tubercle on the right side of the atlas which lies within the articular cavity of the same side, then running transversely behind the odontoid process of the 2d vertebra, it embraces its neck, and passes to a similar tubercle upon the left side, into which it is inserted very powerfully. This ligament is shown separately in Fig. vi.

17. *Superior appendage* of the transverse ligament of the atlas, which arising from the superior margin of the transverse ligament, passes over the odontoid process, and adheres very strongly over the anterior and internal margin of the foramen magnum. Although writers on Syndesmology ascribe a triangular form to this appendage, having the basis looking towards the transverse ligament; nevertheless having examined very carefully this part in several subjects, I have always observed it to increase in breadth near the occipital bone.

18. Inferior appendage of the same ligament. It descends from the lower margin of the transverse ligament, and is attached to the posterior surface of the odontoid process, upon which some of the converging fibres terminate.

19, 19. Bands which pass from the posterior and upper edge of the odontoid process, to the inferior and posterior margin of the anterior arch of the atlas.

20, 20. Lateral ligaments of the odontoid process, running behind the superior appendage, which are more accurately delineated in Fig. vii.

Figure VI.

Shows the 1st and 2d vertebræ of the neck viewed from behind and above, so that the form and course of the transverse ligament, and also the situation and connexion of the sheath-like ligament, may be easily seen.

1. Superior margin of the tubercle of the atlas.

2, 2. Anterior arch of the atlas.

3, 3. Margin of the little cavity which is hollowed from the posterior surface of the tubercle 1, and with which the anterior smooth corresponding surface of the odontoid process is articulated.

4, 4. Superior articular cavities of the atlas incrusted with cartilage, with which the occipital condyles are connected.

5, 5. Transverse processes of the atlas.

6, 6. Foramina perforating these processes for the passage of the vertebral artery.

7, 7. Posterior arch of this vertebra.

8. Certain eminences which in the atlas have the appearance of a spine.

9, 9. Body of the 2d vertebra viewed posteriorly —10. The odontoid process or tooth.—11, 11. Its transverse processes.—12, 12. The inferior oblique processes.—13. The posterior arch.—14. Bifurcated spine.

15. Middle portion of the tranverse ligament, Fig. v. 16, 16.

16. 16. Tapering and very powerful extremities of this ligament which are inserted into the two tubercles near the articular cavities of the atlas.

17. Inferior appendage, Fig. v. 18.

18. Superior appendage cut through.

19, 19, 19. Synovial membrane interposed between the odontoid process at the posterior surface of the anterior arch of the atlas.

20, 20. Ligamentous threads which are seen, Fig. v. 19.

21, 21. Small glands which are situated in certain shallow cavities behind the tubercles to which the extremities of the transverse ligament are attached.

Figure VII.

The basilar portion of the occipital bone, with a portion of the temporal bone, and the two upper cervical vertebræ, viewed posteriorly.

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, same as in Fig. v.

14, 14. Superior articular processes of the 2d vertebra incrusted with a thin cartilage.

15. The body of this vertebra.

16. Posterior surface of the odontoid process, covered with a thin lamina of cartilage.

17, 17. Anterior arch of the atlas.

18, 18. Ligaments, see 19 Fig. v.

19, 19. Ligamentous slips which are attached to the neck of the odontoid process, and ascending obliquely, terminate above the internal margin of the condyloid processes, *(Veitbrecht, Fig. 34. h.)*

20. Superior portions of those ligaments, which arising from the apex of the odontoid process, are spread out here and there, and running horizontally, go to the same superior and internal margin of the occipital condyles to which the slips 19, 19, are attached *(Veitbrecht, Fig. 34. g.)*

21. Middle straight ligament of the odontoid process, ascending from its upper extremity, and inserted into the anterior margin of the foramen magnum, Fig. ii. 10.

22. 22. Two lateral ligaments which are also seen, Fig. ii. 11. 11.

PL. II.

Fig. 3.

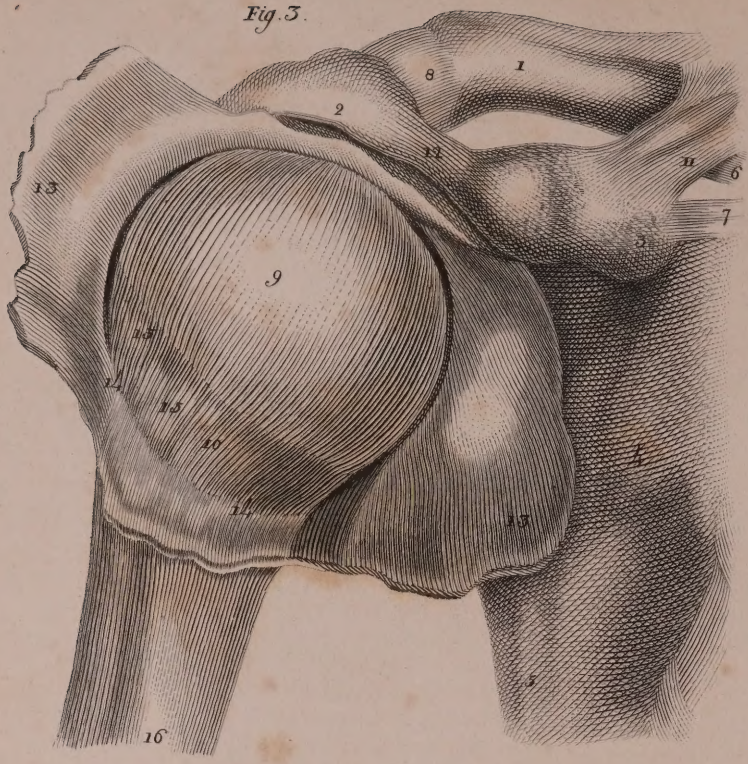


Fig. 2.

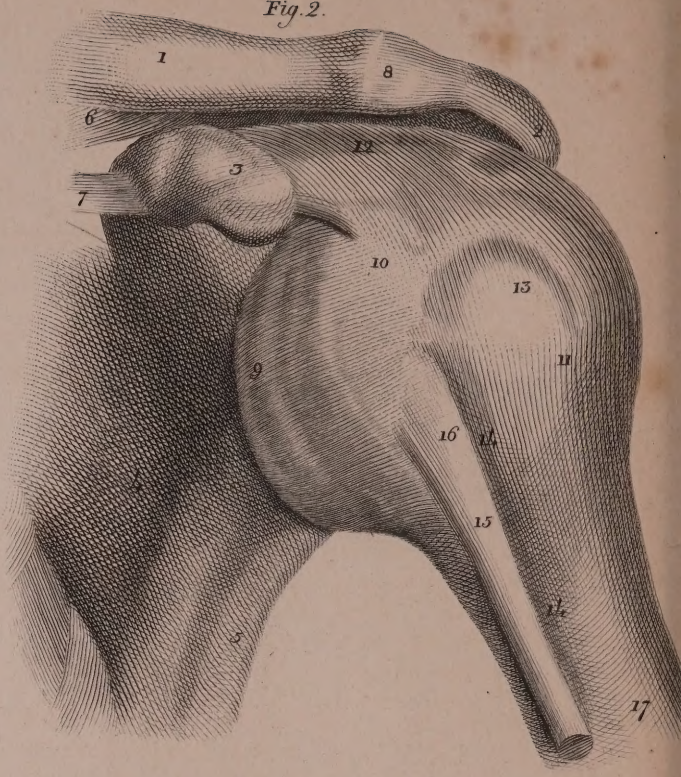
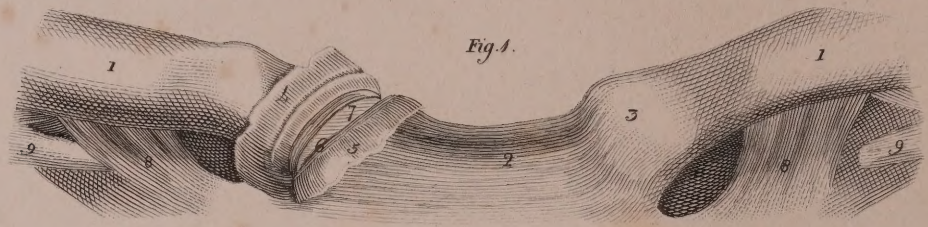


Fig. 1.



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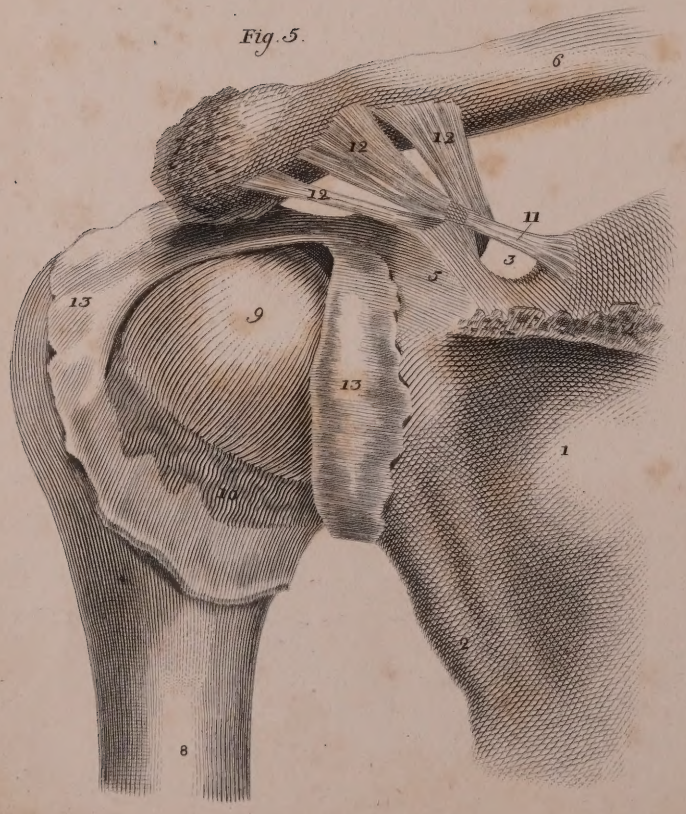

Fig. 4.

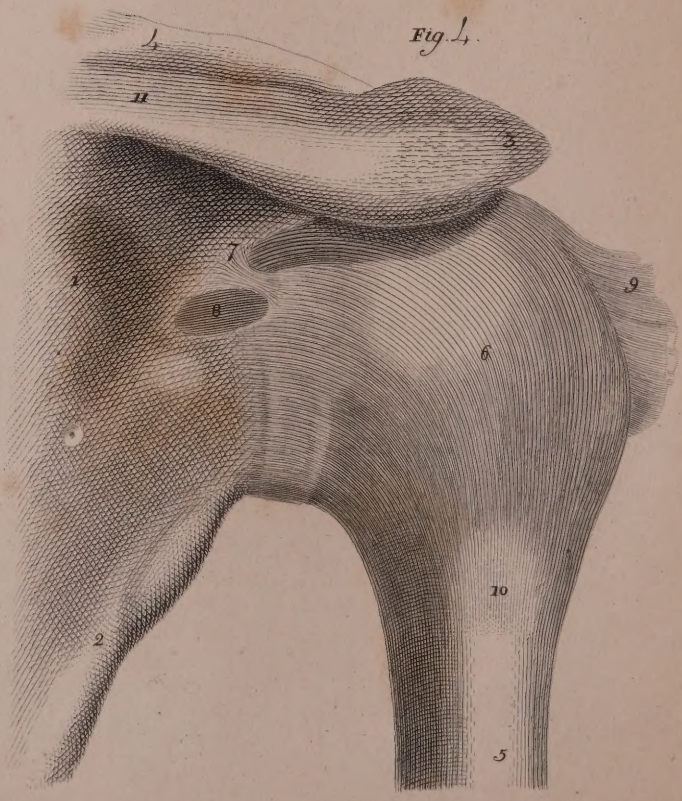

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PLATE II.

Exhibits different views of the Shoulder Joint; also a front view of the Sternoclavicular Articulation.

Figure I.

Shows the right and left sterno-clavicular articulation, viewed from before.

1, 1. Portions of the clavicles.
2. Interclavicular ligament which runs over the sternum from one clavicle to the other.
3. External ligamentous slips which embrace and strengthen the sterno-clavicular articulation. They are composed of strong fibres coming from the inner extremity of each clavicle, and mingling together, form a broad ligament which runs chiefly over the manubrium of the sternum.
4. The Capsular membrane of the right sterno-clavicular articulation is cut through and separated, to show it more fully.—4. The membrane arising from the inner extremity of the clavicle.—5. That portion of it which is attached to the sternum.—6. Margin of the depression in the manubrium of the sternum which receives the inner extremity of the clavicle.—7. Edge of the inter-articular cartilage.
8. *Rhomboid* ligament which arises at a little distance from the upper and back portion of the neck of the clavicle, and descending obliquely and anteriorly, is attached to the cartilage of the first rib, and mingles its fibres with the sterno-clavicular ligaments.
9. Tendon of the subclavius muscle.

Figure II.

Front view of the shoulder joint of the left side with the capsular ligament entire.

1. Portion of the clavicle.
2. Acromion process of the scapula.—3. The coracoid process.—4. The anterior surface of the scapula.—5. Its axillary margin.
6. Portion of the subclavian muscle.
7. Portion of the *ligamentum Bicorne*.
8. Very strong tendinous fibres which surround the acromio-clavicular articulation.
9, 10, 11. *Capsular ligament* of the shoulder joint.
12. *Ligamentous membrane* which Vietbrecht called accessory. It arises from the posterior and outer side of the coracoid process, and proceeding under the *anterior* ligament of the scapula to the outer and upper portion of the capsular ligament, which it covers and strengthens: (the *coraco-humeral* ligament of some writers.)
13. External tuberosity of the humerus.
14, 14. Groove situated between the tuberosities of the humerus, in which runs,
15. The tendon of the long portion of the biceps muscle of the arm.
16. Ligamentous sheath which retains the tendon in its groove.
17. Portion of the humerus.

Figure III.

Front view of the shoulder joint of the right side with the capsular ligament laid open.

1, 2, 3, 4, 5, 6, 7, 8. Same as in Figure 2.
9. Head of the humerus.—10. Its neck.
11. *Trapezoid and conoid* ligaments.
12. *Anterior proper ligament* of the scapula, which arises from the outer margin of the coracoid processes, and terminates upon the anterior surface of the acromion process.
13. Capsular membrane laid open, so as to expose the head of the humerus covered with cartilage.
14, 14. Where the capsular ligament terminates under the neck of the humerus.
15, 15, 15. Small glands which pour out mucus to lubricate the articulation.
16. Portion of the humerus.

Figure IV.

Back view of the right shoulder joint, with the capsular ligament entire.

1. Posterior surface of a portion of the scapula and infra-spinatus fossa.—2. Its axillary margin.
3. Acromion process.
4. Portion of the clavicle.
5. Upper portion of the humerus.
6. Capsular ligament proceeding from the neck of the scapula, and completely surrounding the head of the humerus.

7. Small ligamentous band which arises from the root of the spine of the scapula, and runs into the capsular ligament.
8. Foramen filled up with cellular membrane, through which passes a branch of the circumflex artery going to the acromion.
9. Tendon of the infraspinatus muscle.
10. Where the capsular ligament is connected with the humerus.
11. Portion of the spine of the scapula.

Figure V.

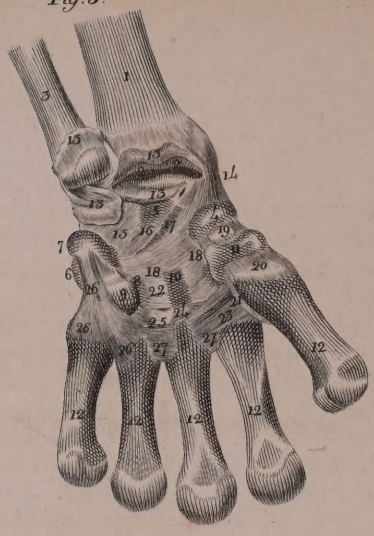
Back view of the left shoulder with the capsular ligament laid open, also the posterior proper and conoid ligaments of the scapula.

1 and 2, Same as in Fig. 4.
3. Notch in the superior margin of the scapula transmitting nerves and vessels.
4. Spine of the scapula cut through.
5. Root of the coracoid process.
6. Portion of the clavicle.—7. its outer extremity.
8. Upper portion of the humerus.
9. Head of the humerus incrusted with cartilage.
10. The neck.
11. Posterior proper ligaments of the scapula. It arises from the acute internal angle of the notch 3, running obliquely outwards to the upper and outer angle of the same notch, or to the posterior protuberance of the root of the caracoid process. Sometimes it is double; it stretches across the notch, and converts it into a foramen.
12. *Common conoid* ligament of the scapula, which arises partly from the posterior proper ligament 11, partly from the root of the coracoid process 5, close to the notch by dense and very powerful fibres, and is attached to the posterior margin and outer extremity of the clavicle.
13. The capsular ligament laid open, to expose the head of the humerus.

PL. III.

Fig. 1.

Fig. 3.



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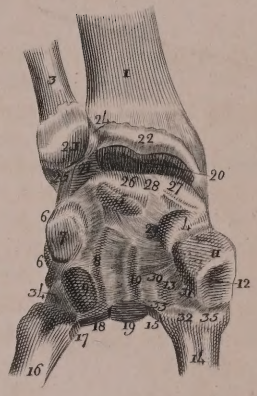

Fig. 5.

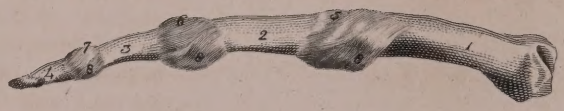

Fig. 2.

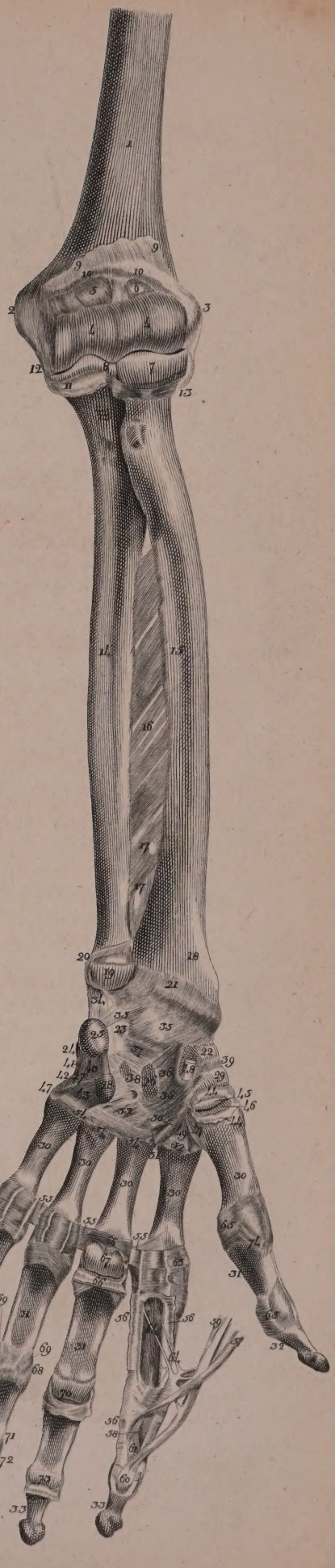

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PLATE III.

SHOWS the Ligaments which connect the humerus with the fore-arm, anteriorly, the fore-arm with the carpal bones and the bones, composing the hand with each other.

FIGURE I.

Anterior superficial ligaments of the right hand.

1. Inferior portion of the humerus. 2. Its inner condyle. 3. The outer condyle.
4. The *Ulna*. 5. The *Radius*.
6. Where the tendon of the biceps humeri is attached.
7. Capsular membrane of the elbow joint.
8. Oblique fibres which strengthen that membrane.
9. Internal lateral ligament. 10. The external.
11. Anterior accessory ligament, which comes from the coronoid process of the ulna, adheres to the capsular ligament, and runs over the anterior surface of the annular ligament of the radius.
12. Interosseus membrane.
13, 13, 13. Openings for the passage of vessels.
14. Inferior extremity of the ulna.
15. Inferior extremity of the radius.
16. Os trapezium.
17. Cuneiform bone.
18. Hooked process of the unciform bone.
19. Pisiform bone.
20, 21, 22, 23, 24. Metacarpal bones.
25. First phalanges of the fingers. 26. Second phalanges,—and 27. The third.
28, 28, 28. Capsular membrane which connects in a loose way, the fore-arm with the carpus.
29. Internal proper ligament of the wrist, which, arising from the Pisiform bone, 19, and from the hooked process of the unciform bone, is inserted like a bridge into the os trapezium and into the navicular bone at 30.
31. Tendon of the flexor carpi radialis muscle.
32. Ligament coming from the metacarpal bone of the thumb, to join the proper ligament of the carpus.
33. Another accessory ligament which embraces the carpal extremity of the metacarpal bone supporting the little finger.
34. Ligamentous fibres descending from the styloid process of the ulna upon the pisiform bone.
35. Some fibres coming from the lower margin of the ulna and attached to the pisiform bone.
36. External straight ligament running between the pisiform bone and the metacarpal bone of the little finger.
37. Ligament which connects the outer margin of the cuneiform bone with the fifth metacarpal bone.
38. Similar ligament between the hooked process of the unciform bone, and the same metacarpal bone.
39. Volar ligament which arises from the base of the fifth metacarpal bone and spreads over the other metacarpal bones.
40. Fasciculus of fibres binding down the insertion of the tendon of the flexor carpi radialis muscle, and connecting the second metacarpal bone with the first.
41. Capsular membrane connecting the navicular and trapezium bones.
42. Similar membrane between the trapezium and the metacarpal bone supporting the thumb.
43. Capsular membrane which strengthens the articulation of the metacarpal bone of the thumb with the first phalanx. 44. Lateral ligament of this joint.
45, Tendon of the long flexor muscle of the thumb. 46. Sheath composed of transverse fibres through which this tendon passes.
47. Oblique ligament.

48. Membrane which joins the first and second metacarpal bones of the thumb.
49. Insertion of the tendon of the long flexor of the thumb.
50. 50, 50. Ligaments which run between the distal extremities of the metacarpal bones.
51, 51, 51. Tendinous sheaths binding down the tendons of the flexor muscles.
52, 53. Origin of the sheath-like ligaments.
54, 54. Transverse ligamentous fibres to the finger joints.
55, 55, 55. Tendons of the sublimis or perforatus muscle.
56, 56. Tendons of the profundus or perforans muscle.
57. Where the tendon of the sublimis muscle is attached to the second phalanx of each of the fingers.
58. Insertion of the tendon of the deep flexor muscle.
59. Crucial ligaments.
60. Oblique ligaments.
61. The sheath-like ligament laid open to expose the tendons of the flexor muscles.
62. Sulcus or canal in which these tendons run.

Figure II.

Deeper ligaments of the hand, seen on the left side.

1, 2, 3. As in Fig. i.
4. Inferior extremity of the humerus incrusted with cartilage.
5. Cavity for the reception of the coronoid process of the ulna during flexion of the elbow joint.
6. Similar cavity which lodges the head of the radius.
7. Head of the radius covered with cartilage.
8. Coronoid process of the ulna.
9, 9. Articular capsule cut through and laid back. 10, 10. Its origin. 11. Where it is attached to the neck of the ulna.
12. Internal lateral ligament.
13. Orbicular ligament of the radius which comes from the anterior margin of the lateral sinus of the ulna with which the head of the radius is articulated. It completely embraces the neck of the radius, see Plate iv. Fig. i. and iii.
14. Body of the ulna.
15. Body of the radius.
16. Interosseous membrane.
17, 17. Openings for the passage of certain nerves and vessels.
18. Lower extremity of the radius.
19. Inferior extremity of the ulna covered with cartilage.
20. Capsular membrane which bound the lower extremity 19, of the ulna to the carpus, cut through and laid back.
21. The same membrane embracing the wrist joint.
22. Navicular bone. 23. Lunar bone. 24. Cuneiform bone. 25. Pisiform bone. 26. Os magnum. 27. Unciform bone. 28. Its hook. 29. Trapezium.
30. Metacarpal bones of the hand.
31, 32, 33. First, second, and third phalanges of the fingers.
34. Ligamentous fibres proceeding from the styloid process of the ulna to the pisiform bone.
35, 35. Fibres which go from the margin of the glenoid cavity of the radius to the pisiform bone 25, and to the lunar bone 23.
36, 36. Fibres proceeding from the navicular bone 22, and from the trapezium 29, to the os magnum 26.
37. Fibrous bands running between the lunar bone 23, and the os magnum 26. 38. Others between the unciform bone 27, and the os magnum 26. 39. Some between the navicular bone 22, and the trapezium 29. 40, between the pisiform bone 25, and the hooked process of the uniform bone,—41, those which connect the pisiform bone to the fifth metacarpal bone.
42. See Fig. i. 37.
43. Ligament between the unciform and the base of the fifth metacarpal bone.
44. Articular capsule connecting the base of the metacarpal bone of the thumb with the trapezium.
45. Margin of the trapezium covered with cartilage, —46. Base of the metacarpal bone of the thumb incrusted with similar cartilage.
47. Internal lateral accessory ligament of the articular capsule, 44.
48, 49. Tendon of the flexor carpi radialis muscle running beneath a ligamentous sheath.—49. Its insertion into the base of the 2d metacarpal bone.
50. Greater superior ligament of the 3d metacarpal bone.
51. Smaller superior ligament of the same bone.
52. Volar ligament between the base of the 2d and 3d metacarpal bones.
53. Volar ligament, between the os magnum and base of the 3d and 4th metacarpal bones.
54, 54, 54. Volar ligament which proceeding

from the 5th metacarpal bone, attaches itself to the 4th, and terminates upon the 3d.

55, 55, 55. Ligaments connecting the heads of the metacarpal bones.

56, 56, 56. See fig. i., 28, 28, 28.

57. Tendon of the sublimis perforatus muscle.—58. Crura of this tendon which are lost upon the 2d phalanx of the finger.

59. Tendon of the profundus muscle.—60. Where it is attached to the last phalanx of the finger.—61. Its short accessory tendon, which is inserted between the tendinous crura of the sublimis muscle.

64, 64. Long bands which belong to the tendon of the sublimis muscle.

65, 65, 65. Articular capsules which strengthen the metacarpo-phalangal articulations.

66, 66. One of the articular capsules cut through to expose the joint.—67. Where it is attached to the groove of the metacarpal bone by means of a small bridle.

68, 68, 68, 68. Lateral ligaments.—69. Inner ligaments of the same articulations.—70. The joint laid open.

71. Inner ligaments of the articulation between the 2d and 3d phalanges.—72. The lateral ligaments.—73. The joint exposed.

74. Lateral and oblique ligament between the metacarpal bone of the thumb and the first phalanx.

Figure III.

Represents some of the carpal and metacarpal ligaments, which are deeper seated than those delineated in Fig. ii.

1. Inferior extremity of the radius. 2, 2. Its glenoid cavity incrusted with cartilage.

3. Inferior extremity of the ulna.

4. Navicular bone.—5. Lunar bone.—6. Cuneiform bone.—7. Pisiform bone.—8. Unciform bone,—9. its hook.—10. Os magnum.—11. Trapezium.

12. The metacarpal bones.

13, 13, 13. Articular capsules of the wrist-joint cut through.

14. Ligament which connects the styloid process of the radius to the navicular bone.

15. Ligamentous fibres proceeding from the lunar to the cuneiform bone.—16. Others which connect the extremity of the radius with the cuneiform bone.—17. Some proceeding from the lunar to the navicular bone.—18. Those which pass from the navicular to the unciform bone.

19. Fig. ii. 39.—20 fig. ii. 42.—21 fig. ii. 47.

22. Bands which pass from the os magnum to the unciform bone.

23. Ligaments which assist in connecting the 2d and 3d metacarpal bones to the trapezium.

24. Fibres proceeding from the os magnum to the 2d and 3d metacarpal bones.

25. Fibres running between the unciform and 3d metacarpal bones.—26, 26, 26. Others between the pisiform and the 3d, 4th and 5th metacarpal bones.

27, 27. Ligaments which connect the carpal extremities of the metacarpal bones to each other.

Figure IV.

The ligaments which are chiefly for the purpose of connecting the bones of the carpus together.

1, 3, 4, 5, 6, 6. As in fig. iii.

7. Surface of the cuneiform bone incrusted with cartilage, upon which the pisiform bone is articulated.

8, 9, 10, 11. As in fig. iii.

12. Surface of the trapezium, with which the metacarpal bone of the thumb is connected.

13. Trapezoid bone.—14. 2d metacarpal bone.—15. Where it is attached to the head of the 3d.

16. Fifth metacarpal bone.—17. Where it is connected to the 4th.

18. Surface of the unciform bone, which corresponds to the base of the 4th metacarpal bone.

19. Surface of the os magnum upon which the 3d metacarpal bone rests.

20. Glenoid cavity of the radius.

21. Inter articular cartilage of the ulna.

22. Articular capsule cut through.

23. Inferior extremity of the ulna.

24. Ligament which comes from the inferior extremity of the radius which faces the ulna: it runs downwards and is fixed into the glenoid depression of the ulna.—25. Small ligaments.

26. Surface of the lunar bone which is articulated with the radius.—27. The same surface in the navicular bone.

28. Small interosseous membrane.

29. See fig. iii. 17.
30. Fibres between the trapezoid and os magnum. —31. Some between the trapezoid and trapezium.—32. Others between the trapezoid and 2d metacarpal bone.—33. Between the os magnum and 2d metacarpal bone.
34. Ligament which connects the base of the 5th metacarpal bone to the cuneiform bone.
35. Ligament connecting the base of the 2d metacarpal bone to the trapezium. The others as in fig. iii.

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Figure V.

Index finger of the right hand with its metacarpal bone and ligaments viewed laterally.

1. Metacarpal bone.—2, 3, 4. 1st, 2d and 3d phalanges.
5. Articular capsule of the metacarpal bone and 1st phalanx.—6 and 7. Similar membranes between the 1st and 2d, and 2d and 3d phalanges.
8, 8, 8. The lateral ligaments.

PL.IV.

Fig.1.

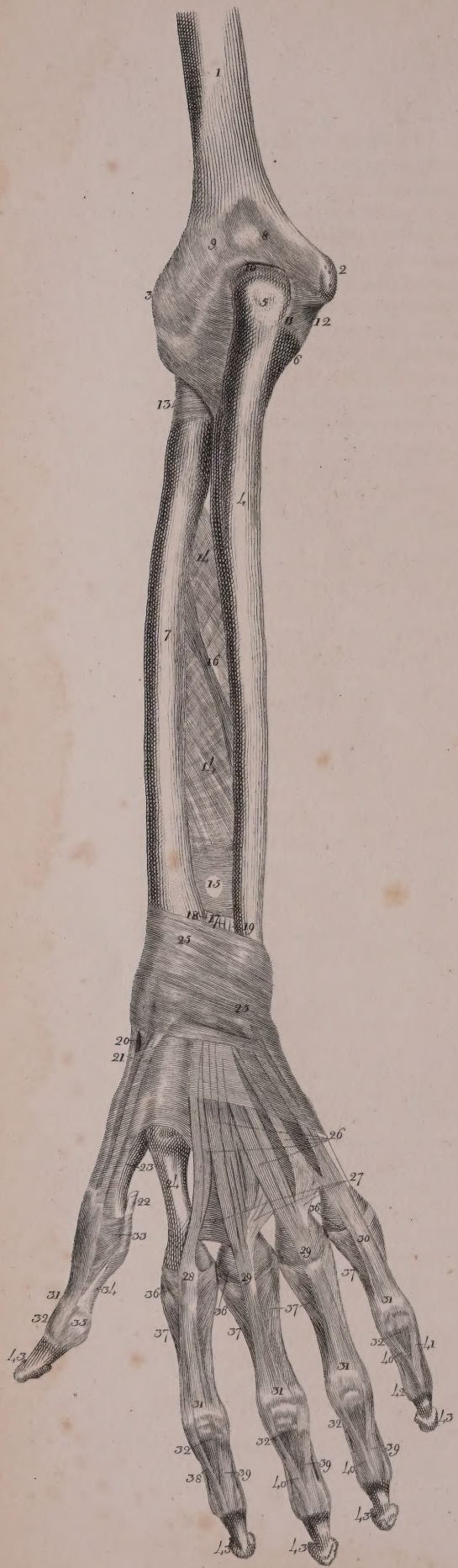

Fig.3.

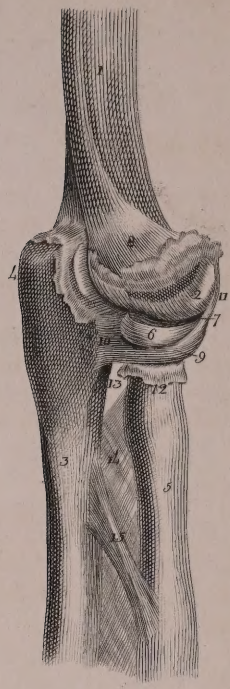

Fig.2.

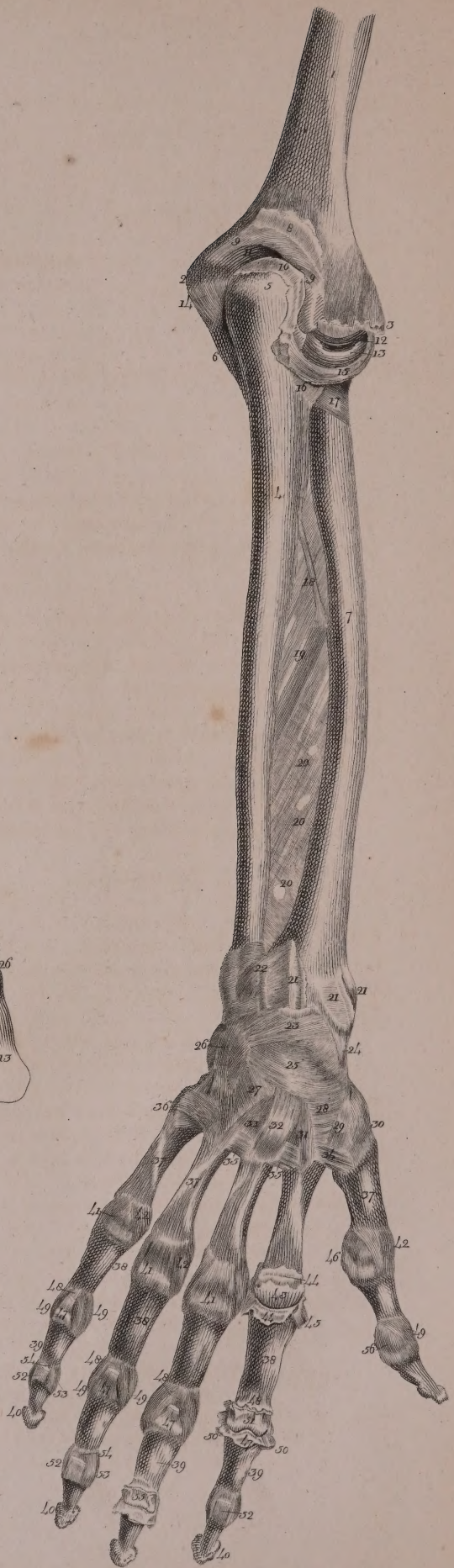

Fig.4.

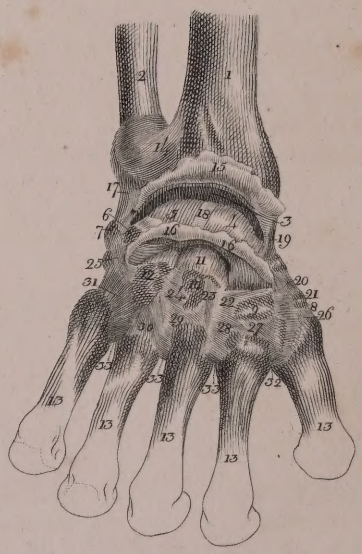

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PLATE IV.

Shows the Ligaments which are situated upon the back of the fore-arm and hand.

FIGURE I.

The ligaments which are seen upon the wrist and hand, when the integuments are removed; also, those binding the humerus to the fore-arm posteriorly.

1. Posterior surface of the humerus.—2. Its inner condyle.—3. The outer.
4. The ulna.—5. The olecranon process.—6. The coronoid process.
7. The radius.
8, 9, 10, 11. Posterior portion of the capsular membrane. (See Pl. iii. fig. i. vii. viii. ix.,) where it descends from the humerus.—10. Where it is inserted into the olecranon process of the ulna.—11. Its attachment to the coronoid process.
12. Internal lateral ligament.
13. Membrane which surrounds the radius loosely, and binds it to the ulna.
14, 14. Interosseous membrane.
15. Opening for the passage of vessels.
16. Transverse cord. See Fig. iii. 15.
17. Tendons of the common extensor muscle of the fingers cut through.—18. Tendon of the indicator muscle.—19. Tendon of the proper extensor of the little finger.
20. Tendon of the extensor of the metacarpal bone of the thumb, or the abductor of the thumb.
21. Tendon of the extensor of the first joint of the thumb, or extensor minor.
22. Tendon of the long flexor muscle of the thumb cut short.
23. First metacarpal bone.—24, The second.
25. Common dorsal ligament of the carpus, which some also term the transverse, or anular ligament, descending obliquely from the radius to the ulna. It binds down the tendons of the extensor muscles of the fingers and hand, and yields peculiar canals or sheaths, for the passage of certain tendons, such as the long abductor of the thumb 20, or the extensor 21.
26. Tendons of the common extensor muscle of the fingers running over the metacarpus.
27, 27, 27. Tendinous portions, by which the tendons on the dorsum of the hand are connected to each other.
28. Tendon of the indicator muscle, and of the common extensor belonging to the index finger.
29. Tendons of the common extensor, distributed to the middle and ring fingers.
30. Tendon of the proper extensor of the little finger.
31. Terminations of the extensor tendons, by which they are attached to the extremities of each of the 1st phalanges.—32. Where they are produced beyond the base of the 2d phalanx, and terminate upon the dorsum of the same bone.
33. Apponeurosis surrounding the articulation of the thumb with the metacarpal bone, and inserted into the common tendon of the extensors of the thumb.
34. See Plate iii. Fig. i. 46.
35. See Plate iii. Fig. ii. 65.
36, 36, 36, 36. Aponeuroses which, produced from the extensor tendons, surround the metacarpo-phalangal articulations.
37, 37, 37, 37. Aponeuroses which arise from the tendons of the lumbricales and interosseal muscles.
38. Tendon of the 1st lumbricalis muscle which, having added some of its fibres to the extensor tendon, terminates upon the last phalanx.
39, 39, 39. Tendons of the interosseal muscles which run in a similar way to the distal phalanx of the index, middle, and ring fingers.
40, 40, 40. Tendon of the interosseal muscles, which, along with the tendons of the lumbricales, are attached to the last phalanx of the middle, ring, and little fingers.
41. Common tendon of the abductor and flexor muscles of the little finger.
42. Retinaculum, so called, of the tendons which belong to the interosseal muscles.

43. Distal phalanges of the fingers.

Figure II.

Ligaments which are met with on the dorsum of the hand, beneath the extensor tendons and annular ligament of the carpus.

1, 2, 3, 4, 5, 6, 7. As in Fig. i.
8. Articular capsule of the elbow joint cut through and laid back.—9, 9. Where it arises from the humerus.—10. A portion of it inserted into the olecranon process of the ulna.
11. Cavity hollowed from the back of the lower extremity of the humerus, which receives the olecranon process of the ulna during extension of the arm.
12. Tubercle of the humerus incrusted with cartilage, with which the head, 13, of the radius is articulated.
14. Internal lateral ligament of the elbow joint.
15. Orbicular ligament of the radius. (See Fig. iii. 9, 10.)
16. Some fibres which, in this subject, join the orbicular ligament.
17. See Fig. i. 13.
18. Transverse cord.
19. Interosseal membrane.
20, 20. Opening for the passage of vessels.
21, 21, 21. Grooves upon the lower extremity of the radius laid over with a strong ligamentous covering, through which the tendons of certain muscles run.
22. Ligamentous membrane which binds the extremity of the ulna to the radius.
23. Ligament, which Veitbrecht termed rhomboid, or very strong fibres which run in an oblique direction from the margin of the cavity of the radius to the cuneiform bone.
24. Fibres proceeding from the styloid process of the radius to the trapezium.
25. Ligamentous membrane which binds together the bones of the carpus externally.
26. Fibres produced from the cuneiform to the hooked bone.
27. Some from the cuneiform to the os magnum, and
28. From the os magnum to the trapezium.
29. Others descending from the ligament 24, to the trapezoid bone.
30. Ligament which conceals the trapezium and its connexion with the metacarpal bone of the thumb.
31. Fibres going from the osmagnum to the 2d metacarpal bone.—32, to the 3d metacarpal bone, and 33, to the 4th.
34. Dorsal ligament which runs from the base of the 1st metacarpal bone to the base of the 2d.
35, 35. Dorsal ligaments lying between the 2d and 3d, and 3d and 4th metacarpal bones.
36. Dorsal ligament between the bases of the 4th and 5th metacarpal bones.
37. Metacarpal bones.
38, 39, 40. First, second and third phalanges.
41. Articular capsules of the metacarpo-phalangal articulations.—42. Their lateral ligaments.
43. Head of the 2d metacarpal bone covered with cartilage.—44. Articular capsule cut through and laid back.—45. The lateral ligaments divided.
46. Membrane which binds the 1st phalanx of the thumb to the tubercle of the metacarpal bone.
47. Tendons of the extensor muscles (fig. i. 29, 30,) cut off.
48. Articular capsule which embraces the articulation between the 1st and 2d phalanges.—49. Lateral ligaments.
50. The same ligaments cut through in the index finger.
51. Head of the 1st phalanx of the index finger covered with cartilage.
52. Tendons of the lumbricales and interosseal muscles (fig. i. 39, 40, 41) where they are attached to the 3d phalanges.—53. The lateral ligaments which connect these bones to the second.—54. The articular capsule of the same joint.—55. Extremity of the 2d phalanx covered with cartilage.
56. Articular capsule which strengthens the joint between the two phalanges of the thumb.

Figure III.

Lower portion of the right humerus with the upper part of the fore-arm viewed externally.
1. Outer side of the inferior portion of the humerus.—2. Its external condyle incrusted with cartilage.
3. The Ulna.—4. The olecranon process.
5. The radius.—6. Its round head covered with cartilage.—7. The glenoid cavity with which the inferior and convex surface of the outer condyle 2, is articulated.
8. The articular capsular represented in the same manner as in Fig. ii. 8, 9, 10.
9. Orbicular ligament of the radius.—10. Where it arises from the margin of the lateral cavity which receives the head of the radius.
11. External lateral ligament which arising from the outer condyle of the humerus descends, and is firmly attached to the orbicular ligament 9, where it is lost.
12. Membrane cut through and turned down, which in Fig. i. is marked 13.
13. Opening through which the external interosseal artery finds its way.
14. Interosseal membrane.

15. Posterior transverse cord of the fore-arm, which descends from the outer margin of the ulna in an oblique direction, and is connected to the radius internally. It takes such a course that it seems to decussate with the fibres of the interosseal membrane.

Figure IV.

The inferior extremity of the right fore-arm with the carpal and metacarpal bones, also the deeper ligaments which are seen on the back of the carpus.

1. Inferior extremity of the radius.
2. Lower portion of the Ulna.
3. Glenoid cavity of the inferior extremity of the radius covered with cartilage.
4. Surface of the navicular bone which is articulated with the arm.—5. The same surface in the lunar bone.
6. Portion of the cuneiform bone.—7. The pisiform bone.—8. Trapezium.—9. Trapezoid.—10. Os magnum.—11. Its superior portion where it is connected to the bones of the upper row.—12. Unciform bone.—13, 13. Metacarpal bones.
14. Membrane, which proceeding from the inner surface of the extremity of the radius, embraces the ulna.
15. Articular capsule, which ran over the first row of the carpal bones descending from the margin of the glenoid cavity, 3. It is cut through and laid up, 16, 16, similar membrane which connected the upper row of carpal bones to the under. It is also divided and laid up.
17. Broad ligamentous cord produced from the styloid process of the ulna to the pisiform bone.
18. A thickish ligamentous membrane adhering to the margins of the bones 4 and 5, which produces a smooth continuous surface. A similar membrane (as may be readily observed in the engraving,) connects the bones 5 and 6. Neither is it to be forgotten that in this region 18, a band often occurs, which is drawn upwards and adheres to the margin of the glenoid cavity of the radius. When this ligament is present, (for it is sometimes awanting) it is called by anatomists the mucous ligament.
19. Ligamentous fibres arising from the styloid process of the radius proceeding to the navicular bone.
20. Band which connects the navicular bone to the trapezium.
21. Fibres between the trapezium and trapezoid bone.—22. Some between the trapezoid and os magnum.
23. Ligamentous cord between the os magnum and the 3d metacarpal bone.
24. Ligamentous fibres between the os magnum and unciform bone.—25. Others between the cuneiform and unciform.
26. Articular capsule between the trapezium and the metacarpal bone of the thumb.
27. Fibres proceeding from the trapezoid to the same metacarpal bone.
28. Ligament which binds the 2d metacarpal bone to the trapezoid and os magnum.
29. Oblique ligament between the unciform bone and the metacarpal bone of the middle finger.
30. Ligament which connects the base of the fourth metacarpal bone to the unciform bone.
31. Articular capsule strengthening the articulation of the metacarpal bone of the little finger with the unciform bone.
32. Lateral ligament between the bases of the 1st and 2d metacarpal bones.
33, 33, 33. Dorsal ligaments which connect the bases of the metacarpal bones.

PL.V.

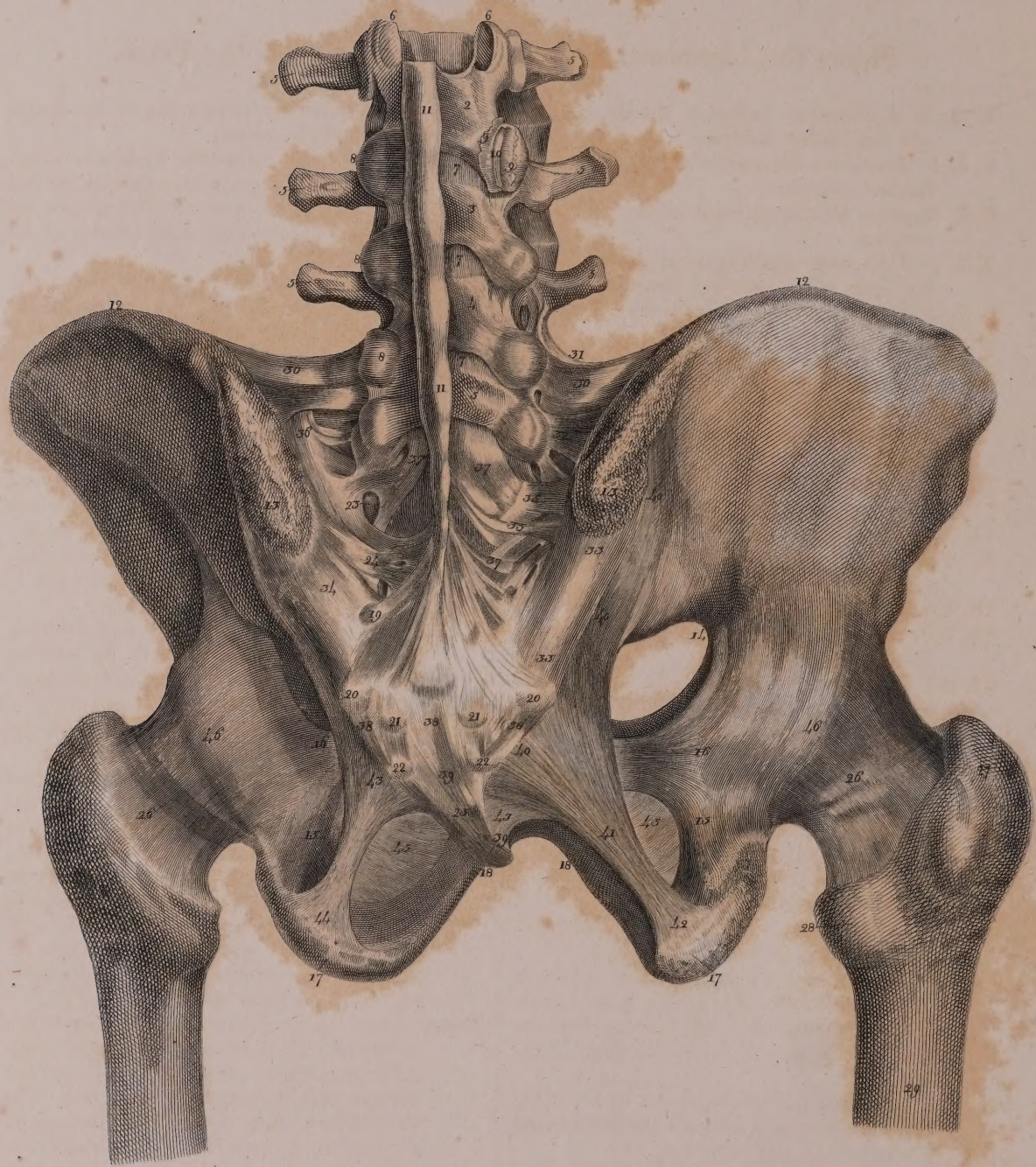

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PLATE V.

Shows the Ligaments on the posterior surface of the Pelvis.

1, 2, 3, 4. Posterior arches of the 2d, 3d, 4th and 5th lumbar vertebræ.

5, 5, 5. Transverse processes of the 2d, 3d and 4th lumbar vertebrae.

6, 6. Superior oblique processes of the 2d lumbar vertebra.

7, 7, 7. *Ligamenta subflava*, running between the back part of the vertebral plates.

8, 8, 8. Ligaments which embrace the articulation of the oblique processes.

9, 10. One of these cut open, to show the oblique processes.

11, 11. Ligamentous cord which unites the apices of all the spinous processes of the vertebrae together.

12, 12. Crest of the ileum.—13. Its posterior and superior spinous process.

14. Ischiatic notch.

15. Descending branch of the ischium.—16. The spine, and 17. Its tuberosity.

18, 18. Posterior surface of the os pubis.

19. Left transverse process of the 3d vertebra of the sacrum.

20, 20. Transverse processes of the fourth vertebra of the sacrum.—21, 21, its tubercles with which the horns of the upper portion of the coccyx are connected.

22, 22. Tubercles of the fifth vertebra of the sacrum.

23. Left posterior and superior foramen of the sacrum; and 24, the second.

25. Second vertebra of the coccyx.

26. Neck of the femur.

27. Trochanter major.—28. Trochanter minor.—29. The shaft or body of the bone.

30, 30, 31. *Ilio-lumbar* ligament, which is seen in Plate VI. 28, 29. But in this subject there is an additional slip, 31, running from the transverse process of the 4th lumbar vertebra.

32. Inferior portion of this ligament on the right side. It is situated beneath the former, and is shorter and very powerful.

33, 33. Long posterior sacro-iliac ligament. It is a thick cord descending obliquely from the superior and posterior spine of the ilium 13, to the transverse process 20, of the fourth vertebra of the sacrum.

34. *Short posterior sacro-iliac* ligament, which arises from the ilium, within the superior and posterior spine 13, and terminates upon the transverse process of the third vertebra of the sacrum.

35, 35. *Posterior lateral* ligaments of the ilium, which connect the first vertebra of the sacrum with the tuberosity of the ilium 13. These are usually termed *anterior sacro-iliac* ligaments.

36. A certain ligament which is deeper seated than the ligaments 35, 35. A cord of this kind comes out superficially from the superior and internal part of the tuberosity 13, and terminates by an oblique course upon the spine of the second vertebra of the sacrum.

37, 37, 37. *Accessory ligaments*, often awanting, which are distributed to different parts of the posterior surface of the sacrum.

38, 38. Ligamentous membranes which descending from the fourth vertebra of the sacrum, pass over the *first* small bone of the coccyx, and almost disappear upon the *second*.

39, 39. Ligamentous bands which connect the other small bones of the coccyx together.

40, 41, 42. *Great sacro-sciatic* ligament. It arises by a broad base 40, 40, 40, from the tuberosity of the ilium, and from the tubercles of the third and fourth bones of the sacrum, also from the internal margin of the sacrum and first coccygeal bone. The fibres proceeding from these points, contract into the ligament 41, which descends in an oblique direction, and again spreading out, are attached to the tuberosity of the ischium 17.

Lesser sacro-sciatic ligament. It arises by a broad base 43, from the two inferior transverse processes of the sacrum, and from the inner margin of all the coccygeal bones. The fibres collect into a cord and are inserted at 44, into the spine of the ischium which they embrace.

45, 45. Obturator ligament.

46, 46. Capsular ligament of the hip-joint.

PLATE V.

Shows the Ligaments on the posterior surface of the Pelvis.

PL.VI.

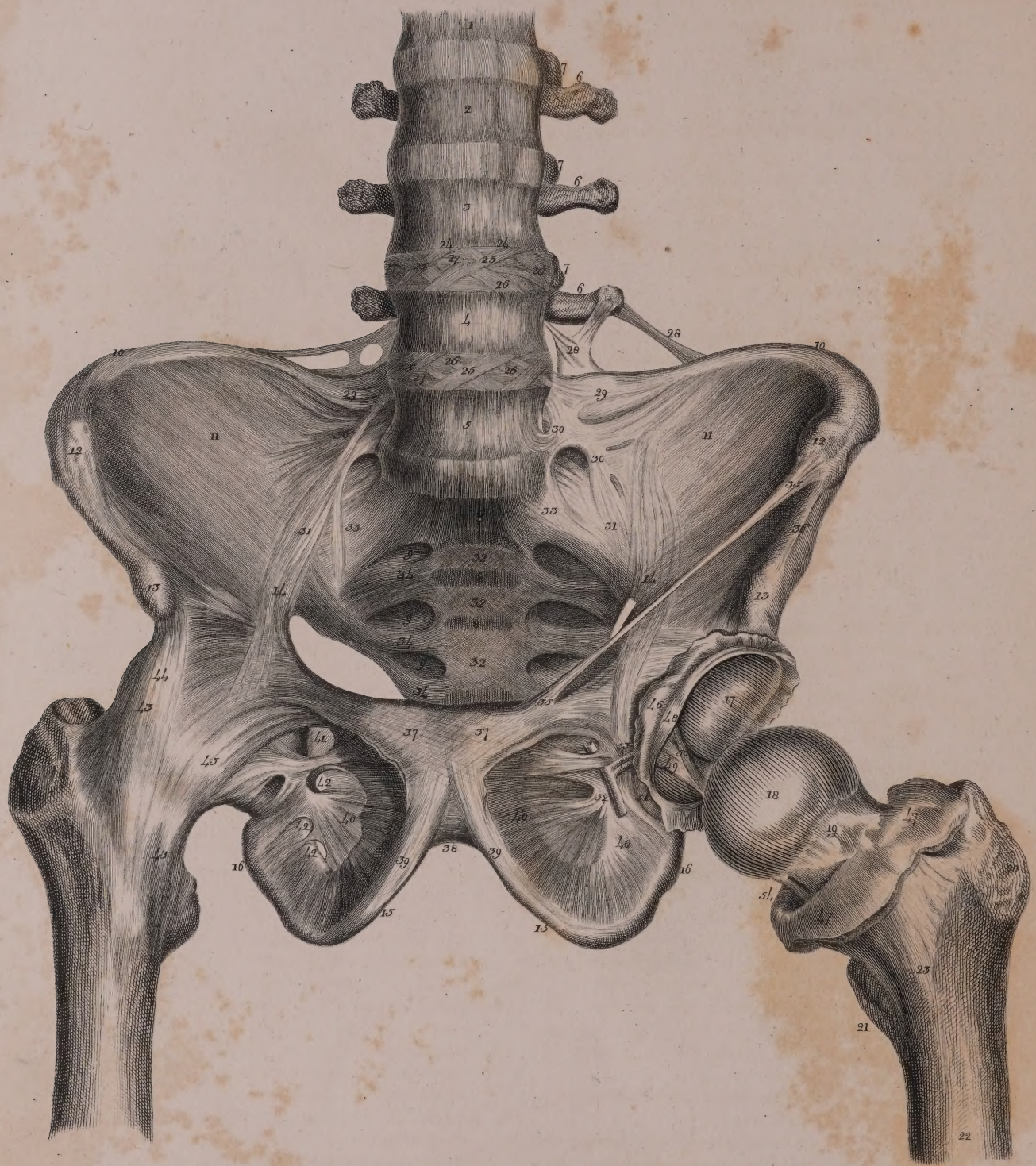
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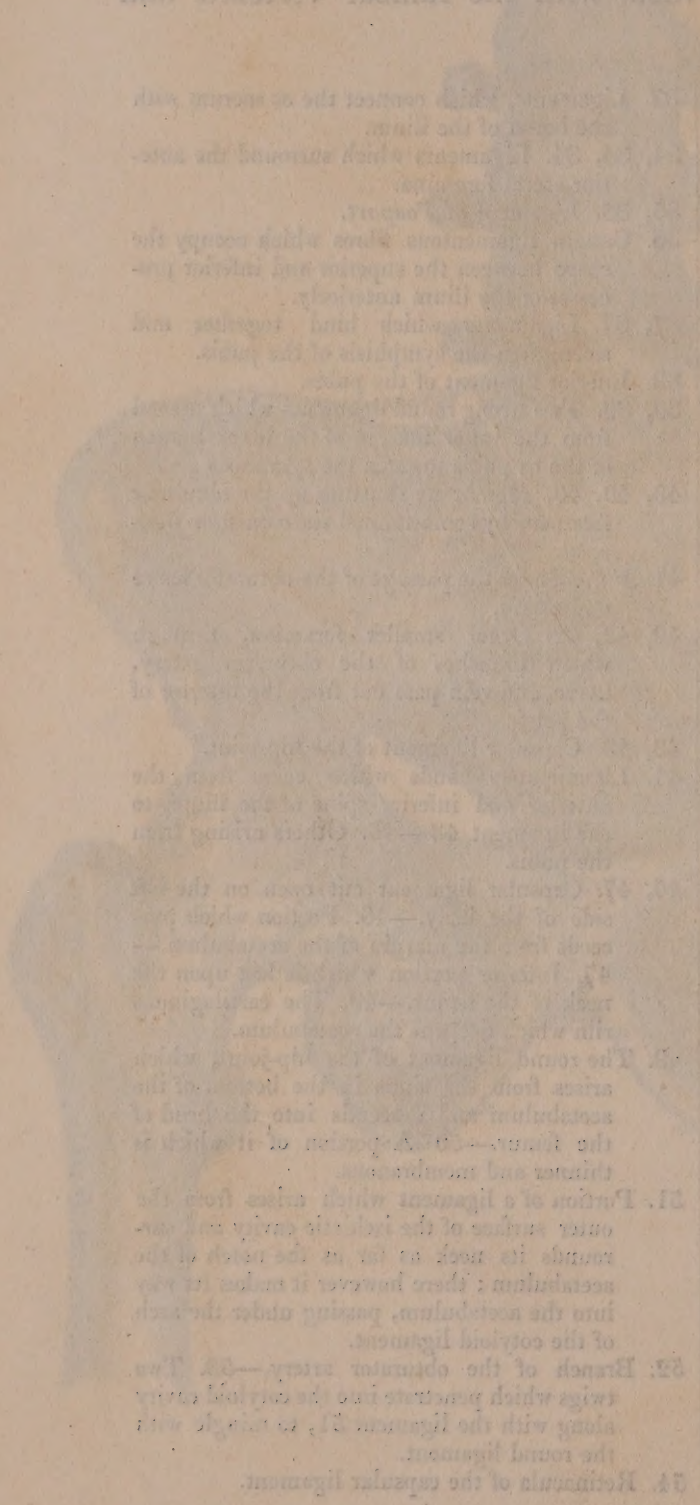
PLATE VI.

Gives an anterior view of the Ligaments which join the bones of the pelvis together, also those which connect them with the lumbar vertebræ and thigh-bone.

1. Portion of the anterior vertebral ligament. It descends from the tubercle of the atlas over the bodies of all the vertebræ.
2, 3, 4, 5. 2d, 3d, 4th, and 5th lumbar vertebræ. 6, 6, 6, their transverse processes. 7, 7, 7, the superior oblique processes.
8, 8. Anterior surface of the os sacrum. 9, 9, 9, the anterior sacral foramina.
10, 10. Crest of the Ilium.
11, 11. Iliac fossa.
12, 12. *Anterior* and *superior* spine of the ilium.
13, 13. *Anterior* and *inferior* spine of the ilium.
14, 14. Brim of the pelvis.
15, 15. Descending branch of the pubis.
16, 16. Descending branch or tubercle of the ischium.
17. Acetabulum or ischiatic cavity.
18. Head of the left thigh-bone incrusted with cartilage. 19. Its neck. 20. Trochanter major. 21. Trochanter minor. 22. The shaft. 23. Rough line into which the capsular ligament of the ileo-femoral articulation is inserted.
24, 24. Where the anterior vertebral ligament is dissected off.
25, 26, 27. Intervertebral cartilaginous ligaments. 25. External fasciculi of these ligaments which pass obliquely from right to left, and proceed from the upper margin of one vertebra to the inferior edge of that above it. 26. Internal slips which are under the exterior fibres and run in an opposite direction. 27. Fasciculi of both fibres united, which are placed almost transversely.
28, 28. Tendinous bands running between the transverse process of the 4th lumbar vertebra and the crest of the ilium.
29, 29. Very powerful ligaments, which connect the ossa innominata to the transverse processes of the 5th lumbar vertebra.
30, 30, 30. Ligaments which pass out from the same process, over the ilium, form broad arches, and leave spaces for the passage of the lumbar nerves.
31, 31. Ligamentous membrane which covers the brim of the pelvis interiorly.
32, 32. Ligamentous membrane which, formed of decussating fibres, occupies that part of the sacrum to which were attached in the foetus the cartilaginous ligaments 25, 26, 27.
33. Ligaments, which connect the os sacrum with the bones of the ilium.
34, 34, 34. Ligaments which surround the anterior sacral foramina.
35, 35. Ligament of *Poupart*.
36. Certain ligamentous fibres which occupy the space between the superior and inferior processes of the ilium anteriorly.
37, 37. Ligaments which bind together and strengthen the symphisis of the pubis.
38. Inferior ligament of the pubis.
39, 39. Two strong round ligaments which ascend from the inner margin of the lower branch of the os pubis towards the symphisis.
40, 40, 40. Membrane shutting up the obturator foramen, by some termed the *obturator ligament*.
41. Foramen for the passage of the obturator nerve and artery.
42, 42, 42. Other smaller foramina, through which branches of the obturator artery, nerve, and vein pass out from the interior of the pelvis.
43, 43. Capsular ligament of the hip-joint.
44. Ligamentous bands which come from the anterior and inferior spine of the ilium, to the ligament 43.—45. Others arising from the pubis.
46, 47. Capsular ligament cut open on the left side of the body.—46. Portion which proceeds from the margin of the acetabulum.—47. Inferior portion which is lost upon the neck of the femur.—48. The cartilaginous rim which deepens the acetabulum.
49. The round ligament of the hip-joint, which arises from the sinus in the bottom of the acetabulum and descends into the head of the femur.—50 A portion of it which is thinner and membranous.
51. Portion of a ligament which arises from the outer surface of the ischiatic cavity and surrounds its neck as far as the notch of the acetabulum ; there however it makes its way into the acetabulum, passing under the arch of the cotyloid ligament.
52. Branch of the obturator artery.—53. Two twigs which penetrate into the cotyloid cavity along with the ligament 51, to mingle with the round ligament.
54. Retinacula of the capsular ligament.

PLATE VI.



PL.VII.

Fig.1.

Fig.2.

Fig.3.

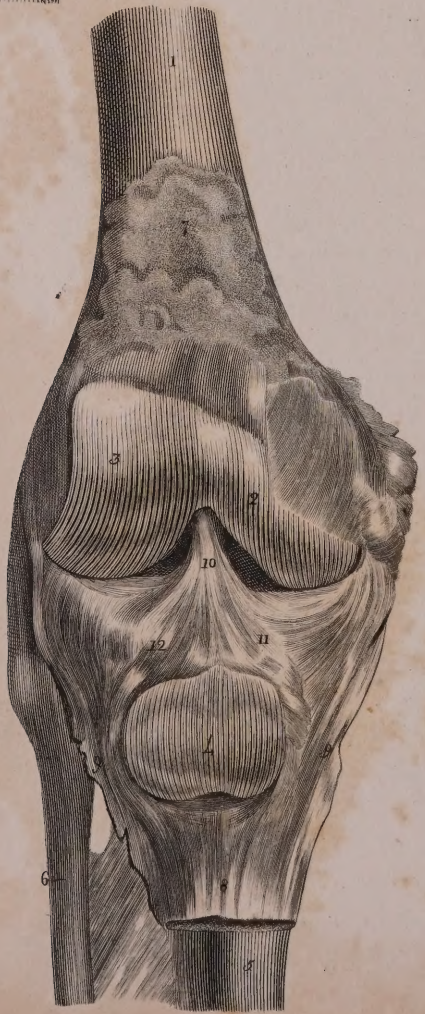


Fig.4.

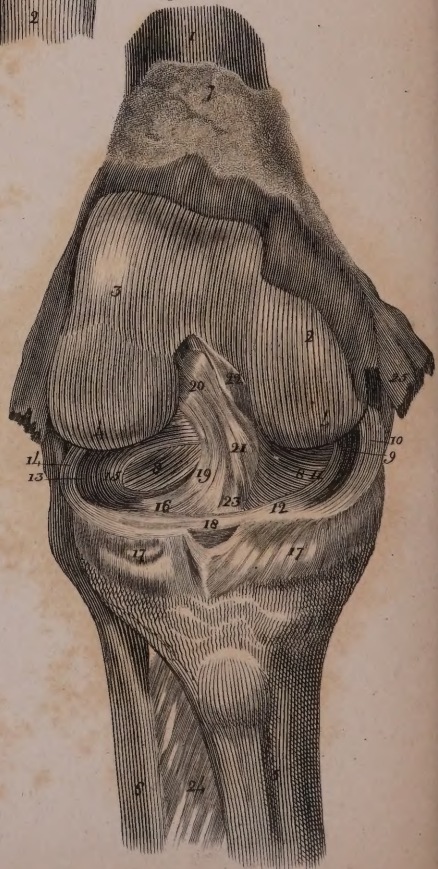


Fig.5.

E.Mitchell.Sculp.

PLATE VII.

Shows the Ligamentum Teres of the Hip-Joint, and the Ligaments of the Knee-Joint, anteriorly.

Figure I.

The os innominatum of the right side, with the upper portion of the femur.

1, 1. Right os ilium.
2. Os ischium.—3. Its tuberosity.—4. Its ascending portion.
5. Superior or horizontal portion of the os pubis. —6. Its descending branch.
7. Portion of the pubis by which it is joined to its fellow of the left side.
8. Obturator foramen.
9. Upper portion of the right femur.—10. Trochanter major.—11. Trochanter minor.—12. The neck of the femur.—13. Its head, which is covered with cartilage.
14, 14. Ischiatic cavity, or acetabulum covered with a similar layer of cartilage.—15, 15. Cotyloid ligament deepening the cavity.
16. Notch through which vessels make their way into the acetabulum, that they may be distributed to those parts which are contained in the acetabulum itself.
17. Cartilaginous ridge, which, in a manner, limits the notch 16, inferiorly. From this eminence, a cartilaginous band or ligament proceeded to 18, under which the vessels passed, as if under a bridge.
19, 19. Remarkable glands, which are concealed in the sinus of the acetabulum.
20. Origin of the *exterior* ligament which arises from the os ischium, under the inferior and internal margin of the acetabulum; it turns round the eminence 17; enters the acetabulum, under the bridge of which we have spoken, and forms the inferior portion of the *round* ligament.
21. Portion of this ligament, within the acetabulum, running to the head of the femur.
22. Anterior and longer portion of the *interior* ligament arising from the margin of the acetabulum, where the cartilaginous band is fixed into 18.
23. Shorter portion of the same *interior* ligament, which properly arises from the sinus of the acetabulum.
24. Two small twigs, branches of the obturator artery, which pass through the ligament, concealed by cellular membrane and the ligaments, 21, 22, and 23. (Plate VI. 52, 53.)

Figure II.

The capsular membrane of the knee-joint.

1. Inferior extremity of the femur.
2. Superior portion of the tibia.
3. The fibula.
4. Tendon of the rectus muscle of the thigh.
5. Lower portion of the *vastus internus* muscle. —6, 6. Where the tendon of this muscle is joined to the fleshy fibres.
7. Muscular fibres of the vastus externus muscle.
8, 8, 8, 8. *Capsular membrane, namely, the general covering, (as Veitbrecht calls it,) formed by the aponeurosis of the extensor muscles. A covering of this kind runs over the patella; it will be seen, by looking at the engraving, that the tendinous prolongations of the muscles decussate upon the dorsum of the patella itself.
9, 9. Tendon of the rectus muscle connecting the patella with the tibia. The fibres which proceed in transverse directions over the tendon belong to the aponeurosis of the tensor vaginæ femoris.
10, 10. The *internal* lateral ligament of the knee.
11. Tendon of the gracilis muscle cut through.
12. Interosseal membrane.

Figure III.

Right knee, in which the capsular membrane has been cut through superiorly, and laid back along with the patella.

1. Femur.—2, 3. Its internal and external condyles incrusted with a thin cartilage.
4. Posterior surface of the patella covered with a similar cartilage.
5. Tibia.
6. Fibula.
7. Fat.
8. Tendon of the rectus cruris muscle (Fig. II. 4.) turned down, covered by a thin membrane, which is properly the capsular membrane.

---

* The name of general covering, or involucrum, as it was called by Veitbrecht, is preferable to that of capsular membrane.

9, 9. Inner surface of this membrane.
10. Mucous ligament of the knee-joint.
11. Internal greater *alar* ligament.—12. External smaller *alar* ligament.

Figure IV.

The same knee with the patella removed, and the joint slightly flexed.

1, 2, 3, as in fig. 3.
4, 4. Articular surfaces of the condyles.
5, 6, 7, as in fig. 3.
8, 8. Glenoid cavities hollowed from the upper surface of the tibia, which correspond with the condyles 4, 4. Cartilaginous plates cover those depressions.
9. *Internal* semilunar cartilage.—10. Its thickened external margin.—11. Internal crescentic and thin margin.—12. Its anterior horn.
13. *External* semilunar cartilage.—14. Its external margin.—15. The internal margin.—16. Its anterior horn.
17, 17. Membranes which descend from the outer margins of the semilunar cartilages, and are lost upon the edge of each of the glenoid cavities.
18. Common *transverse* ligament, which proceeds from the external edge of the semilunar cartilage 13, beyond the anterior line of the tibia, and terminates upon the inner horn of the internal cartilage 9.
19. Ligaments by which the anterior horn of the external semilunar cartilage is attached to the anterior crucial ligament. Veitbrecht calls it the first adhesion of the external cartilage.
20, 21. *Anterior crucial* ligament descending from the inter-condyloid depression, and particularly from the inner side of the outer condyle, and running obliquely downwards, is attached to the inner margin of the internal glenoid cavity of the tibia.
22. Upper portion of the *posterior crucial* ligament, arising from the outer side of the internal condyle.
23. A slip which strengthens the transverse ligament 18, and mingles both with the ligament arising from the anterior horn of the external cartilage, and with the anterior crucial ligament.
24. Interosseous membrane.
25. Internal lateral ligament cut through.

Figure V.

The upper surface of the tibia, with the semilunar cartilages.

1. Anterior tuberosity of the tibia.
2. *Internal* glenoid cavity incrusted with cartilage.—3. The *external* cavity also covered with smooth cartilage.
4. *Internal* semilunar or falciform cartilage.—5. The external cartilage.
6, 6. The thick edges of these cartilages.—7, 7. The thinner edges.
8. *Anterior* horn of the internal cartilage.—9. The posterior horn.
10. Common transverse ligament.
11. Anterior horn of the external cartilage.—12. The posterior horn.
13. Anterior crucial ligament.
14. Posterior crucial ligament.

PL. VIII.

Fig. 1.

Fig. 2.

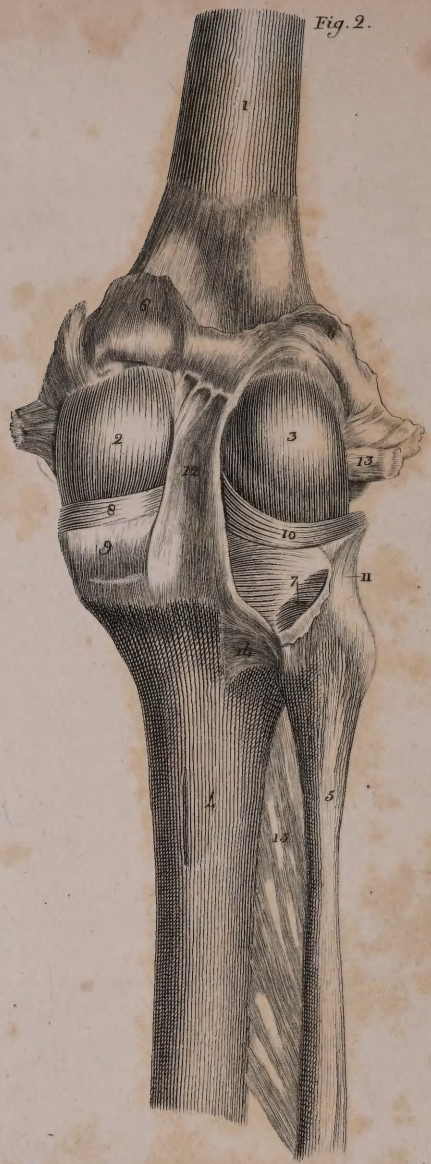


Fig. 3.

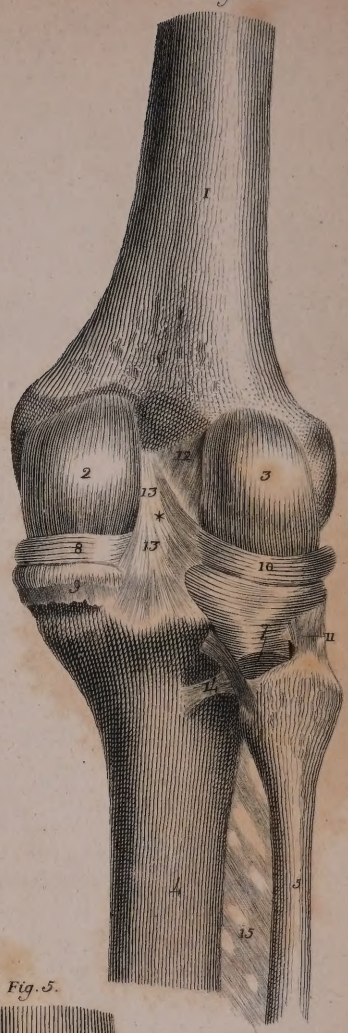


Fig. 4.

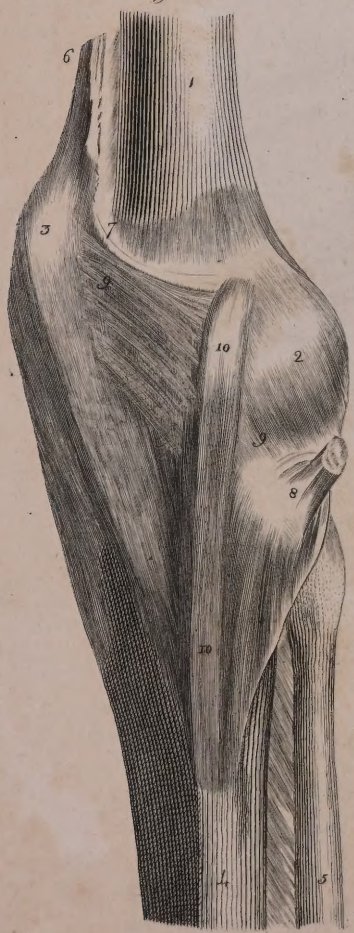


Fig. 5.

Fig. 6.

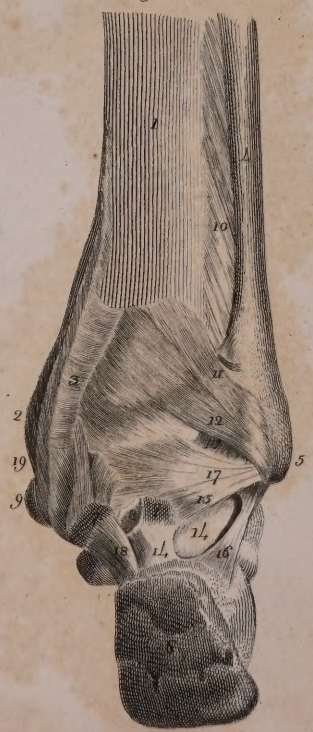


PLATE VIII.

Shows the Posterior and Lateral Ligaments of the Knee-Joint; also the Posterior Ligament of the Ankle-Joint.

Figure I.

Superficial ligaments of the knee viewed posteriorly.

1. Posterior surface of the femur.—2. Its *internal* condyle.—3. The *external.*
4. Posterior surface of the tibia.
5. Fibula.
6. Tendon of the *semitendinosus* muscle.
7. Portion of the aponeurotic membrane from the *semimembranosus* muscle, which is inserted into the tibia.
8, 8. Posterior ligament of *Winslow.*—9. Where it descends from the outer condyle.
10, 10. Capsular membrane of the knee.
11. Long external lateral ligament.—12. The short external lateral ligament.
13. Capsular membrane of the fibula.
14. Fibres which bind the fibula to the tibia posteriorly.
15. Interosseus membrane.

Figure II.

Other ligaments lying beneath the superficial posterior ligament of the knee.

1. Posterior surface of the femur.—2. The inner condyle incrusted with cartilage.—3. The outer condyle.
4, 5. As in fig. 1.
6, 6, 6. Capsular membrane cut through.
7. Sinus upon the outer side of the head of the tibia, with which the fibula is articulated.
8. *Internal* semilunar cartilage.—9. ligamentous membrane by which it is connected with the tibia.
10. *External* semilunar cartilage.
11. Capsular membrane strengthening the articulation of the head of the fibula, and which ascending, adheres to the margin of the *external* semilunar cartilage.
12. Cord, or ligamentous fascia arising from the sinus of the femur separating the condyles posteriorly, which running beneath the capsular membrane, passes downwards, and is attached to the head of the tibia.
13. Portion of the external lateral ligament cut through.
14, 15. As in fig. 1.

Figure III.

Crucial ligaments of the knee-joint viewed posteriorly.

1, 2, 3, 4, 5, 7, 8. As in fig. 2.
9. Membrane, by which the internal semilunar cartilage is attached to the tibia, cut through and turned back.
10. External semilunar cartilage.
11. Certain fibres belonging to the capsular covering by which the fibula is articulated with the tibia.
12. Portion of the *anterior* crucial ligament inserted into the outer condyle.
13, 13. Posterior crucial ligament which arises from the outer side of the internal condyle, and descending somewhat obliquely, terminates between the two posterior tuberosities of the tibia.
* Attachment of the posterior horn of the external semilunar cartilage; namely, a ligament passes out from the edge of that cartilage, which ascending and joining the posterior crucial ligament, 13, 13, is attached to the outer condyle of the femur.
14, 15. As in fig. 1.

Figure IV.

Shows the internal lateral ligament of the knee-joint.

1. Internal surface of the femur.—2. The inner condyle.
3. Where the patella projects.
4. Inner surface of the tibia.
5. Fibula.
6. Tendon of the rectus cruris muscle.
7. Portion of the tendon belonging to the *vastus internus* muscle.
8. Tendon of the *semitendinosus* muscle.
9, 9. Capsular membrane of the knee.
10, 10. Internal lateral ligament.

Figure V.

Shows the *external* lateral ligament of the knee.

1. Outer side of the femur.—2. Its external condyle.
3. Patella.
4. Outer side of the tibia.
5. Fibula.
6. Tendon of the rectus cruris muscle.
* Where the capsular membrane is strengthened by the tendon of the *vastus externus*.
7. External tendon of the gastrocnemius muscle.
8. Insertion of the plantaris muscle.
9. Tendon of the biceps cruris.
10. Capsular membrane of the knee.
11. *Long* external lateral ligament.
12. *Short* or lesser external lateral ligaments.
13. Transverse ligamentous cord binding the head of the fibula to the tibia anteriorly. It is unusually strong in this subject.
14, 14. Other bands which assist in connecting the fibula itself to the tibia anteriorly.

Figure VI.

Inferior extremity of the tibia and fibula, with the bones of the tarsus viewed posteriorly.

1. Posterior surface of the tibia.
2. Internal malleolus.
3. Groove through which passes the tendon of the tibialis posticus muscle.
4. The fibula.
5. External malleolus.
6. The calcaneum.
7, 7. Two eminences of the os astragalus, which form the groove through which the tendon of the long flexor of the great toe runs.
8. Where this tendon makes a passage for itself.
9. Internal extremity of the navicular bone.
10. Interosseal membrane of the leg.
11. *Superior* and posterior ligament of the external malleolus.
12. *Inferior* and posterior ligament of the outer malleolus.
13, 13. Portion of the capsular membrane, which binds the tibia to the tarsus or to the os astragalus.
14, 14. Similar membrane connecting the astragalus with the calcaneum.
15. Ligament running between the fibula and, 7, the outer eminence of the astragalus.
16. Middle perpendicular ligament of the fibula, see Plate IX. fig. 3.
17. Fibres arising from the inferior extremity of the fibula, and running transversely, which are inserted into, 7, the inner eminence of the astragalus, and into the lower and posterior margin of the tibia.
18. Ligament between 7, the inner eminence of the astragalus, and the calcaneum.
19. Deltoid ligament, see Plate IX. fig. 4.

PL.IX.

Fig.3.

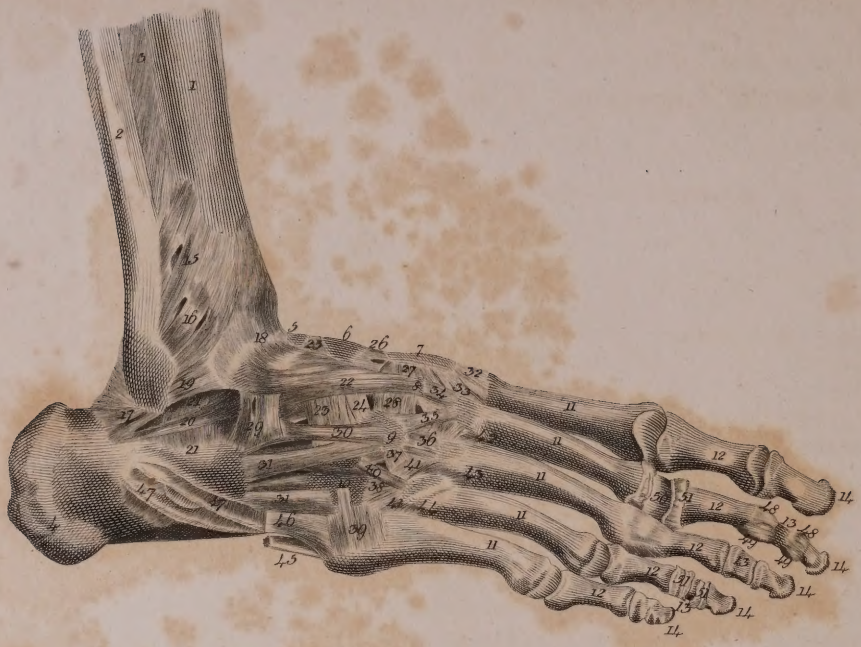


Fig.4.

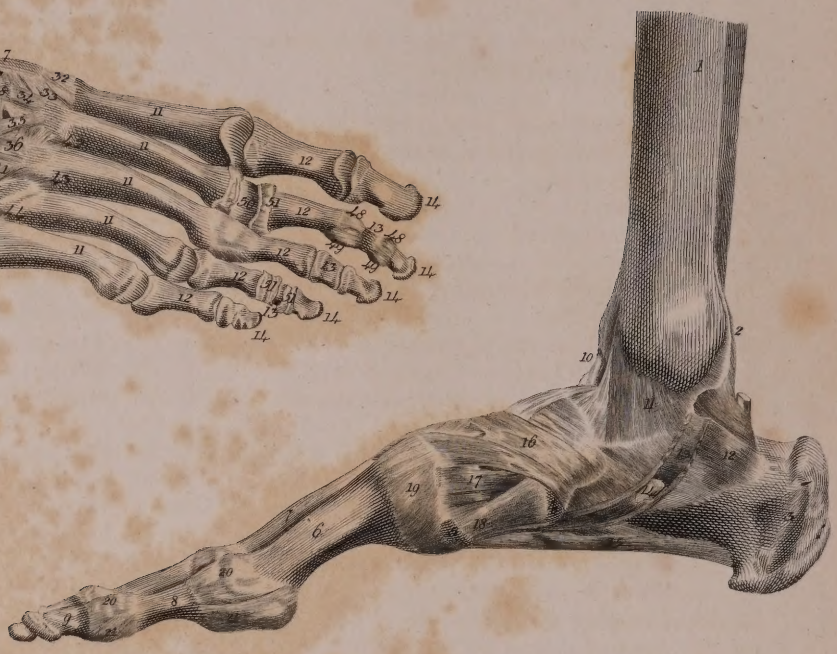


Fig.1.

Fig.2.

E. Mitchell, Sc.

PLATE IX.

Shews the Ligaments of the Foot.

Figure I.

Aponeurotic sheath of the foot viewed externally.

1. Inferior portion of the leg, with the muscles shining through the aponeurosis.
2. Tendo Achillis.
3. Os calcis.
4. Fifth metacarpal bone.
5. First phalanx of the second toe.
6, 6, 6. Second phalanges of the second, third, and fourth toes.
7, 7, 7, 7, 7. Last phalanges of the toes.
8. Tendon of the peroneus longus muscle.
9. Tendon of the peroneus brevis muscle, covered with the aponeurosis.
10, 10, 10. Tendons of the long extensor muscle of the toes.
11, 11, 11. Tendons of the short extensor muscle of the toes.
12, 12. Where the extensor tendons of the second toe are cut through.
13, 13. Common crucial ligament.
14, 14. Aponeurosis of the foot.
15. Retinaculum of the peroneal tendons.
16, 16, 16. Transverse fibres, or retinacula of the extensor tendons.
17, 17, 17. Capsular membranes connecting the phalanges of the toes.
18, 18, 18. Lateral ligaments.

Figure II.

The same Aponeurosis viewed internally.

1, 1. As in Fig. I.
2. Inferior extremity of the tibia.
3. Os calcis.
4. First metacarpal bone.
5, 5. Last phalanges of the toes.
6. *Abductor* muscle of the great toe.
7. Plantar aponeurosis.
8. Extensor proprius pollicis muscle.
9, 9. Superior portion of the crucial ligament, which is inserted into the inner side of the tibia. See Fig. I. 13, 13.—10. Its inferior portion.
11, 11. Aponeurosis of the foot.
12. Fibres which form the retinaculum of the extensor tendon of the great toe.
13. Internal cutaneous ligament, or tendinous fibre arising from the first phalanx of the great toe, upon the inner side, and proceeding to its extremity.
14. Deltoid ligament of the inner ankle.
15. See Fig. III.

Figure III.

The Dorsum of the foot, with its ligaments viewed externally.

1. Portion of the tibia.
2. Portion of the fibula.
3. Interosseal membrane of the leg.
4. Os calcis.
5. Os astragalus.
6. Navicular bone.
7. Internal cuneiform bone.
8. Middle cuneiform bone.
9. Outer cuneiform bone.
10. Cuboid bone.
11. Metatarsal bones.
12, 12, 12. First phalanges of the toes.
13, 13, 13. Second phalanges of the other toes.
14. Last phalanges of the toes.
15. Anterior superior ligament of the outer malleolus.
16. Anterior and inferior ligament of the same.
17. Middle perpendicular ligament of the fibula.
18. Capsular membrane of the ankle joint.
19. Anterior ligament between the fibula and astragalus.
20. Internal lateral ligamentous band between the astragalus and os calcis.
21. Ligament, or strong ligamentous membrane between the calcaneum and astragalus.
22. Ligamentous fascia, proceeding from the astragalus to the navicular bone, 6. and to the middle cuneiform bone, 8.
23. Ligament between the astragalus and cuboid bone—24. between the navicular and external cuneiform bone—25. between the astragalus and navicular bone—26. between the navicular and internal cuneiform bone.
27. Ligamentous fibres between the inner and middle cuneiform bones.
28. Ligamentous fibres between the middle and external cuneiform bones.
29. Anterior and lateral perpendicular ligaments descending from the astragalus to the calcaneum, where there is an irregular cavity.

30. Ligament between the calcaneum and the outer cuneiform bone.
31, 31. Ligaments between the calcaneum and cuboid bone.
32. Capsular ligament connecting the first metatarsal bone with the inner cuneiform bone.
33. Ligament between the *inner* cuneiform and the metatarsal bone of the second toe.
34. Ligament between the *middle* cuneiform and the metatarsal bone of the second toe.
35. Ligament between the same metatarsal and *outer* cuneiform bone.
36. Ligament between the outer cuneiform bone and the metatarsal bone of the third toe.
37. Ligament between the same cuneiform bone and the metatarsal bone of the fourth toe.
38. Oblique ligament between the cuboid bone and the metatarsal bone of the fourth toe.
39. Ligament between the cuboid bone and the metatarsal bone of the fifth toe.
40. Fibres proceeding straight from the cuboid bone to the metatarsal bone of the fourth toe.
41. Dorsal ligaments of the bases of the metatarsal bones.
42. Lateral ligament between the bases of the second and third metatarsal bones.
43. Lateral ligament between the bases of the third and fourth metatarsal bones—44. between the fourth and fifth.
45. Tendon of the peroneus *longus* muscle.
46. Tendon of the peroneus *brevis* muscle—47. canals through which these tendons run.
48, 48, 48. Fig. I. 17.
49, 49, 49. Fig. I. 18.
50. The joint laid open.
51. Capsular membrane cut through and laid back.

Figure IV.

Dorsum of the foot, with its ligaments viewed upon the inner side.

1. Portion of the tibia.
2. Sulcus behind the inner ankle.
3. Os calcis.
4. Navicular bone.
5. Internal cuneiform bone.
6. The first metatarsal bone; and 7 the second.
8. First phalanx of the great toe; and 9 of the second.
10. Capsular membrane of the tarsal articulation.
11. Deltoid ligament.
12. Oblique fibres between the astragalus and calcaneum, upon the inner side.
13. Sheath, through which runs the tendon of the tibialis posticus muscle, 14.
15. Plantar aponeurosis.
16. Ligamentous apparatus between the navicular bone and the middle and outer cuneiform bones.
17. Dorsal ligament between the navicular bone and the inner cuneiform bone.
18. Lateral ligament between these bones.
19. Capsular membrane of the inner cuneiform bone and the metatarsal bone of the great toe.
20. Similar membrane connecting the phalanges of the great toe together.
21. Oblique and lateral ligaments of the same articulations.

PL. X.

Fig. 1.

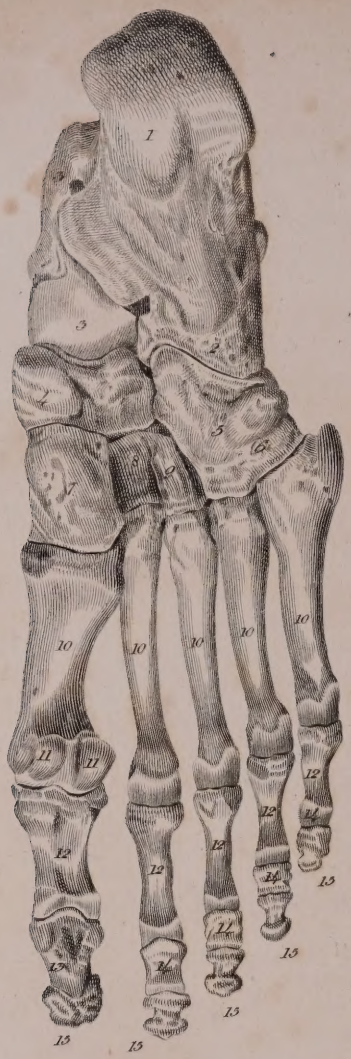


Fig. 2.

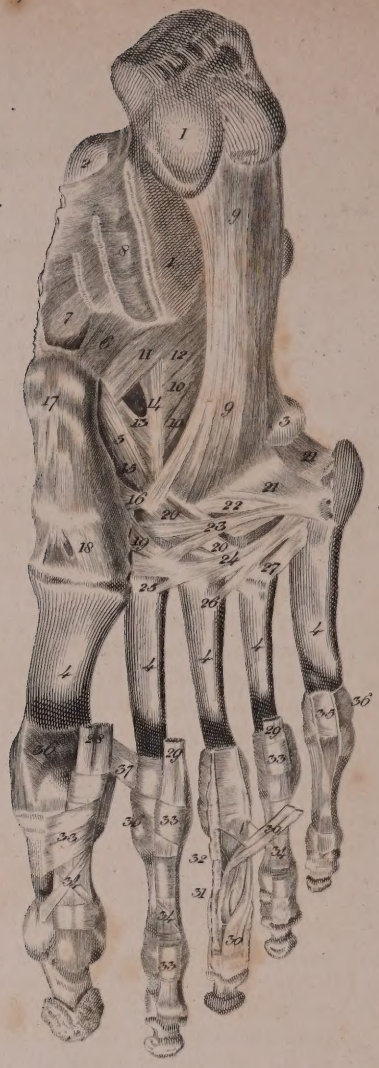


Fig. 3.

Fig. 5.

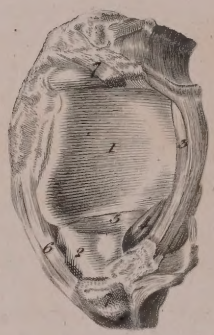


Fig. 4.

E. Mitchell Sculp.

PLATE X.

Shews the remaining Ligaments of the Foot.

Figure I.

The Bones of the foot viewed inferiorly.

1. Calcaneum,—2. its anterior tuberosity.
3, 3. Astragalus.
4. Navicular bone,—6. a groove in that bone.
7. Inner—8. Middle, and 9 the Outer cuneiform bone.
10, 10, 10. Metatarsal bones.
11, 11. Sesamoid bones.
12. First phalanges of the toes.
13. Second bone of the great toe.
14. Second phalanges of the other toes.
15. Last phalanges.

Figure II.

Ligaments seen in the sole of the foot.

1, 1. Calcaneum.
2. Astragalus.
3. Cuboid bone.
4. Metatarsal bones.
5. Tendon of the tibialis posticus muscle—6. ligamentous sheath, through which it passed to the sole of the foot.
7. Furrow in which the same tendon ran.
8. Portion of the aponeurosis which belongs to the flexor longus pollicis muscle.
9, 9. Plantar ligament, arising from the anterior surface of the tuberosity of the calcaneum, and proceeding straight to the cuboid bone.
10. Oblique ligament running between the same two bones.
11. Oblique ligament between the calcaneum and navicular bone.
12. Round ligament between these bones.
13. Transverse ligament, which passes from the navicular to the cuboid bone.
14. A band which goes straight from the posterior portion of the cuboid to the outer cuneiform bone.
15. Plantar ligament between the navicular and middle cuneiform bone.
16. Transverse plantar ligament, between the internal and external cuneiform bones.
17. Articular capsule connecting the navicular to the inner cuneiform bone.
18. Similar capsule between the inner cuneiform and the metatarsal bone supporting the great toe.
19. Ligament between the internal cuneiform and the third metatarsal bone.
20. Ligament between the outer cuneiform and the fourth metatarsal bone.
21. Articular capsule between the fifth metatarsal and cuboid bone.
22. Band which passes transversely from the fifth metatarsal to the outer cuneiform bone.
23. Transverse ligament of the fifth metatarsal bone.
24. Common plantar ligament of the metatarsal bones.
25. Plantar ligament between the second and third metatarsal bones.—26, between the 3d and 4th.—27, between the 4th and 5th.
28. Tendon of the flexor proprius pollicis muscle.
29, 29. Tendons of the common flexor muscle going to the 2d and 4th toes.
30. Tendon of the perforans muscle to the 3d toe.
31. Tendon of the perforatus muscle belonging to the same toe.
32. Tendinous bands of these tendons.
33, 33, 33. Tendinous sheaths which bind down the flexor tendons.
34, 34. Crucial ligaments.
35. A sheath laid open which contained one of the flexor tendons.
36, 36. Articular capsules which connect the phalanges of the toes with the metatarsal bones.
37. Ligamentous membrane between the heads of the first and second metatarsal bones. It is the same in the other toes.

Figure III.

The sole of the foot, with some of the deeper ligaments.

1, 2, 3. As in Figure II.
4. Navicular bone.
5. Internal cuneiform bone.
6. External cuneiform bone.
7. Metatarsal bones.
8. Ligamentum planum, or, calcaneo-scaphoid ligament.
9. Round ligament between the calcaneum and navicular bone.
10. Oblique ligament which binds the calcaneum to the cuboid bone.
11. Transverse ligament between the navicular and cuboid bone.
12. Oblique ligament running under the ten-

don of the tibialis posticus muscle from the navicular to the cuboid bone.
13. Ligament between the navicular and external cuneiform bone.
14. Posterior ligament between the cuboid and outer cuneiform bone.
15. External transverse ligament, from the cuboid to the outer cuneiform bone.
16. Articular capsule connecting the navicular bone to the cuboid.
17. Ligamentous membrane, binding together the metatarsal bone of the great toe and inner cuneiform bone.
18. Ligament, which arising from the inner cuneiform bone, terminates upon the 2d metatarsal bone.—19. a fasciculus of fibres arising from the same cuneiform bone, pass on to the 3d metatarsal bone.
20. Tendinous fibres, or articular capsule connecting the base of the 3d metatarsal to the outer cuneiform bone.
21. Ligament, which arising from the outer cuneiform, terminates upon the fourth metatarsal bone.
22, 22. Plantar ligament between the bases of the metatarsal bones, viz. between the bases of the 2d and 3d, and 3d and 4th, &c.
23. Connexion of the 5th metatarsal bone with the cuboid.

Figure. IV.

A portion of the sole of the foot, with the remaining deeper ligament.

1, 1. Os calcis.
2. Portion of the astragalus with which the navicular bone is connected, covered with cartilage.
3. Navicular bone, 4. Cuboid, 5. Inner cuneiform 6. Middle, and 7. Outer cuneiform bones.
8, 9, 10. First, second, and third metatarsal bones.
11. Short internal ligament between the calcaneum and navicular bone.
12. Rhomboid ligament which connects the calcaneum to the cuboid bone.
13. Internal mucous ligament between the astragalus and navicular bone.
14. Membrane binding the navicular to the inner cuneiform bone.
15. Ligament between the navicular and middle cuneiform bone.
16. Articular capsule connecting the middle cuneiform to the second metatarsal bone.
17. Posterior short and powerful ligament between the cuboid and middle cuneiform bone.
18. Fibres running transversely from the inner surface of the cuboid, where it looks to the outer cuneiform bone, and is attached to that cuneiform bone.
19. Ligament proceeding from the inner cuneiform to the middle cuneiform bone.
20. Lateral interosseal cord between the middle cuneiform and second metatarsal bone.
21. Cord between the outer cuneiform and third metatarsal bone.
22. Middle cord belonging to the same metatarsal bone.
23. External lateral interosseal ligament of the 3d metatarsal bone.
24. Curved lateral ligament, arising from the cuboid bone, which is inserted into the metatarsal bone.
25. Fibres between the bases of the 2d and 3d metatarsal bones.

Figure V.

Lower extremities of the right Tibia and Fibula, where they are connected with the tarsus.

1. Base of the tibia covered with cartilage.
2. Extremity of the fibula, where it corresponds with the astragalus.
3. Inferior and posterior ligament of the ankle joint.
4. Internal ligament between the tibia and fibula posteriorly.
5. Mucous ligament.
6. Ligament between the fibula and tibia anteriorly.
7, 7. The remaining ligaments by which the leg is connected and bound to the tarsus.